

anastomosing throughout, but the tips commonly free at the pinna margin. **Fertile pinnae** linear, 3–10 cm long, 0.2–0.5 cm broad, the tips obtuse or acute, the slender, tawny or light brown paraphyses scattered sparsely among the sporangia.

Terrestrial, commonly becoming scandent on tree trunks, in lowland forests, 100–900 m, Loreto and Huánuco to Madre de Dios.

Greater Antilles (except Jamaica); Colombia to the Guianas, south to Bolivia and Brazil; Argentina.

Plants initially are terrestrial; later they become scandent on trees but retain their terrestrial connection. Stems often creep for long distances, and are slender along the ground but stouter on trees. Fertile leaves most commonly occur on the scandent stems and are often most numerous toward the stem apex.

Loreto: Peña Blanca on Río Ataya, Killip & Smith 29674 (F, US). **Huánuco:** Prov. Pachitea, Dist. Honoria, Bosque Nacional de Iparia, Schunke V. 1372 (F, GH, US). **Pasco:** Puerto Bermúdez (as Junín), Killip & Smith 26572 (F, US). Prov. Oxapampa, Quebrada Castilla, along Río Omaiz, Léon & Young 1064 (F, USM). Pichis Trail, Santa Rosa (as Junín), Killip & Smith 26158 (GH, US). **Ucayali:** Prov. Padre Abad, Bosque Nacional von Humboldt, Narite 3 (USM). **Madre de Dios:** Maldonado, El Pilar, López & Soukup 4583, 4613 (US).

XXV. *Elaphoglossum*

Contributed by John T. Mickel

Elaphoglossum John Sm., J. Bot. (Hooker) 4: 148. 1841, *nom. conserv.* **TYPE:** *Elaphoglossum conforme* John Sm. **Figure 25.**

Epiphytic, terrestrial, or epipetric. **Stem** compact to long-creeping, horizontal, rarely erect, slender to stout (1–15 mm in diameter). **Stem scales** orange to black, basally attached or peltate, entire to dentate or ciliate. **Leaves** monomorphic or usually more or less dimorphic, 2–200 cm long, erect, spreading or pendent, simple or rarely pedate. **Petiole** glabrous or scaly, sometimes also with minute glandular trichomes, long or very short, base often darker (phyllodium) with abscission at its upper demarcation rather than at the stem. **Lamina** linear to ovate or oblanceolate, apex acuminate or caudate to obtuse, base rounded (rarely cordate) to long-attenuate or decurrent; costa sulcate adaxially, usually with scales similar to those of the petiole abaxially. **Veins** generally free, rarely anas-

tomosing or with a marginal commissural vein, simple to twice-forked, ending near the margin, those ending well short of the margin usually terminating in conspicuous hydathodes. **Lamina scales** generally differing from those of the stem or petiole, abundant to lacking, often greatly reduced and appearing as stellate trichomes. **Fertile leaves** longer or shorter than the sterile ones but generally with narrowed laminae and proportionally longer petioles. **Fertile lamina** completely covered abaxially with sporangia (acrostichoid sori). **Sporangia** long-stalked, the annulus erect, interrupted by the stalk; paraphyses (in the form of intersporangial scales) present in some species, but generally lacking. **Spores** bilateral, monolete, most with high crests or low ridges, but some echinate or verruculate without ridges or crests.

There are probably well over 600 species in *Elaphoglossum*, more than three-fourths of them occurring in tropical America. There are 121 species recognized in Peru, although our knowledge of them is far from complete. Several are known from only one or a few specimens. The genus is very difficult taxonomically; it has not been adequately treated with a usable subgeneric breakdown until recently. Variation of the characters, such as plant size, lamina form, scale color, and scale type, is not fully understood in terms of species delimitation. The characters lie mostly in the scales of the stem and lamina. The fertile leaves add characters of relative size, intersporangial scales, and spore details, but virtually all the species can be identified on the basis of vegetative material alone. Unfortunately, collectors are hesitant to collect sterile material and thus many records have gone uncollected. The large number of new species described here is a reflection of the enormous diversity within the genus and gives an indication of our heretofore poor knowledge of this fascinating group.

In the following descriptions, the stem diameter is given excluding the scale covering. The stem scales may be appressed or widely spreading and might too greatly distort the stem diameter measurements were they included. In the key and descriptions, the terms "leaves" and "laminae," when not specifically referring to fertile leaves and laminae, refer to sterile ones, which are much more abundant than the fertile. Petiole bases are differentiated into evident phyllodia in some but not all species. Although the veins seem to run to the margin in some species, they end just short of it, leaving a pale, thin margin 0.5–1 mm wide, which

is often difficult to distinguish, especially in very coriaceous or heavily indumented leaves. This margin is more readily distinguished in the fertile leaves where it remains sterile in contrast to the acrostichoid sorus of the rest of the lower surface. Vein angles and intervein distances are measured at midleaf, halfway between the costa and margin. The scales of the stem and lamina are generally quite distinct from one another, and on the petiole they intergrade or in some cases remain distinct and occur together. The lamina scales, although basically the same type on upper and lower surfaces, are more highly dissected abaxially. In some this means longer teeth, but in more extreme cases they are reduced to stellate trichomes or even to resinous dots. In subglabrous leaves, the lamina scales are reduced further in size to minute stellate trichomes (trichomidia) that are visible only with a lens. On the fertile lamina, the scales adaxially are similar to those of the sterile lamina, but abaxially the scales are generally limited to the costa and in only a few species are there scales among the sporangia. Another type of indument is minute, erect glandular trichomes, which are found in varying degrees on the petiole and occasionally on the lamina in *E. lindenii*, *E. erinaceum*, *E. tam-*

billense, *E. rubellum*, *E. haynaldii*, and their relatives.

In most cases *Elaphoglossum* is distinct in its simple lamina, only rarely becoming pedate or crested, and generally has free veins and acrostichoid sori.

This treatment contains numerous citations from Christ's "Monographie des Genus *Elaphoglossum*," which appeared in the journal *Denkschr. Schweiz. Naturf. Ges.* 36. 1899. In the interest of brevity the publication is cited throughout as Monogr. *Elaphoglossum*.

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Key to Species of *Elaphoglossum*

a. Sterile leaf bearing linear-lanceolate scales that are usually inrolled to appear hairlike (subulate), at least on petiole but generally throughout the leaf, and/or with veins ending in hydathodes b

b. Hydathodes lacking; leaves (25–)35+ cm long c

c. Petiole lacking; lamina narrowly oblanceolate; lamina scales orange d

d. Stem scales slightly sinuous; sterile lamina 12–56 × 1.7–6.0 cm; lamina apex acuminate to long-caudate; spore ridges smooth, surrounding a perforated area 97. *E. raywaense*

d. Stem scales conspicuously flexuous; sterile lamina 45–95 × 7.7–9.5 cm; lamina apex acuminate to sharply cuspidate; spore ridges short-spiny, surrounding an area with fine spines 3. *E. amazonicum*

c. Petiole present; lamina narrowly elliptic to lanceolate (rarely oblanceolate); lamina scales black to dark brown e

e. Lamina scales very sparse, deciduous 93. *E. propinquum*

e. Lamina scales conspicuous f

f. Lamina base attenuate g

g. Lamina narrowly oblanceolate, 4.6–6.3 cm broad; petiole scales dense, 4–5 mm long 12. *E. blepharoglossis*

g. Lamina linear-elliptic, 1.4–1.7 cm broad; petiole scales sparse, 1–2 mm long 44. *E. hystrix*

f. Lamina base rounded to subcordate h

h. Lamina base rounded; 700–3325 m elev. 28. *E. erinaceum*

h. Lamina base truncate to subcordate; 200–3200 m elev. 11. *E. barbatum*

b. Hydathodes present, or if lacking, leaves only 6–15 cm long i

- i. Stem long-creeping, petioles 0.5–3 cm apart j
 - j. Lamina oblong-ovate, 6.5–12 cm broad, lamina base deeply cordate 86. *E. pascoense*
 - j. Lamina elliptic to linear-elliptic, 1.2–4.8 cm broad; lamina base cuneate to truncate k
 - k. Lamina scales dark brown, curved; leaves 6–12 cm long 13. *E. camptolepis*
 - k. Lamina scales orange to dark brown, straight; leaves 14–40 cm long l
 - l. Stem 1–2 mm in diameter m
 - m. Leaves 8–12 cm long, 0.6–1.3 cm broad; petiole 0.5–0.7 mm in diameter; fertile lamina 1.5–2.5 cm long 35. *E. gracillimum*
 - m. Leaves 30–47 cm long, 1.8–3.0(4.8) cm broad; petiole 1.4–1.7 mm in diameter; fertile lamina 11–13 cm long 50. *E. latevagans*
 - l. Stem 3–4 mm in diameter n
 - n. Sterile lamina chartaceous, margin crenulate, base truncate; petiole ca. $\frac{1}{2}$ the sterile leaf length, 0.8–1.0 mm in diameter; petiole scales patent, dark brown 105. *E. simulans*
 - n. Sterile lamina subcoriaceous, margin entire, base rounded; petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, 1–1.5 mm in diameter; petiole scales appressed to ascending, orange 82. *E. pachyrhizum*
- i. Stem short-creeping, petioles less than 0.5 cm apart o
- o. Leaves 15–70 cm long, or if smaller, lamina scales 3–5 mm long p
 - p. Leaves nearly sessile, petiole nearly lacking or winged; lamina with white patches between veins q
 - q. Lamina linear-ob lanceolate; petiole essentially lacking 19. *E. zebrinum*
 - q. Lamina elliptic to oblanceolate; petiole winged to base 2. *E. alipes*
 - p. Leaves distinctly petiolate; lamina lacking regular white patches between veins r
 - r. Petiole $\frac{1}{4}$ or more of total leaf length; lamina lanceolate to elliptic, (2)3–10 cm broad (rarely linear), 1.1–1.6 cm broad; lamina and petiole scales linear-lanceolate to lanceolate, plane, rarely subulate s
 - s. Leaves 70–110 cm long, lamina 8.0–12.8 cm broad, with subulate scales 10. *E. bakeri*
 - s. Leaves 16–55(–75) cm long; lamina 2.2–7.8 cm wide, with lanceolate or linear-lanceolate scales (rarely subulate in *E. rufum*) t
 - t. Lamina 3–8 cm broad u
 - u. Lamina with sparse scales ca. 1 mm long; leaves 32–75 cm long v
 - v. Petiole black, especially of the fertile leaves 15. *E. castaneum*
 - v. Petiole of both sterile and fertile leaves dull gray-green 85. *E. papillosum*
 - u. Lamina with abundant scales 2–3 mm long; leaves 22–30 cm long w
 - w. Lamina elliptic, never proliferous; intersporangial scales black 1. *E. albescens*
 - w. Lamina lanceolate, usually proliferous at apex; intersporangial scales orange-tan x
 - x. Scales of petiole and lamina margin subulate; petiole scales spreading, abundant; intersporangial scales sparse to lacking 102. *E. rufum*
 - x. Scales of petiole and lamina margin lanceolate; petiole scales appressed, scattered; intersporangial scales abundant 117. *E. wardiae*
 - t. Lamina 2.0–2.4 cm broad y
 - y. Sterile lamina rounded at base 24. *E. diversifrons*
 - y. Sterile lamina attenuate at both ends z
 - z. Petioles pale; lamina scales orange-tan, scattered 80. *E. oxyglossum*
 - z. Petioles black; lamina scales dark red-brown, very sparse 68. *E. moyeri*

r. Lamina linear to narrowly elliptic, 0.6–3.2 cm broad; petiole scales subulate or lanceolate a2

a2. Lamina scales (other than costal) less than 1 mm long, entire b2

b2. Petiole scales subulate to lanceolate, spreading; stem scales linear-lanceolate, spreading c2

c2. Petiole and costal scales dark red-brown, subulate 30. *E. eximum*

c2. Petiole and costal scales tan, lanceolate 84. *E. palorense*

b2. Petiole and stem scales ovate, appressed d2

d2. Lamina undivided, entire 103. *E. russelliae*

d2. Lamina pedately lobed (5–7 lobes) 14. *E. cardenasi*

a2. Lamina scales over 2 mm long, denticulate e2

e2. Lamina scales 3–6 mm long; fertile lamina round to oblong, obtuse; fertile leaf much shorter than the sterile f2

f2. Lamina apex acuminate to acute-cuspidate, 1.3–2.4 cm wide; base cuneate; glandular trichomes to 0.5 mm long; 1500–2450 m elev. 39. *E. haynaldii*

f2. Lamina apex acute to obtuse, 2.1–3.2 cm wide; base rounded; glandular trichomes ca. 0.2 mm long; 400–500 m elev. 100. *E. rubellum*

e2. Lamina scales 1–2 mm long; fertile lamina lanceolate to long-oblong, about equal to sterile leaf or longer. g2

g2. Lamina 1.7–2.4(3.6) cm wide; fertile lamina truncate at base, 1.8–2.3 cm wide 104. *E. setigerum*

g2. Lamina 0.9–1.6 cm wide; fertile lamina rounded at base, 0.6–1.6 cm wide h2

h2. Leaves 28–38 cm long; lamina apex acuminate; petiole ca. $\frac{1}{4}$ the leaf length; stem scales 3–5 mm long; veins 2–3 mm apart; lamina scales subulate, dark brown 92. *E. poeppigianum*

h2. Leaves 11–21(32) cm long; lamina apex acute to obtuse-apiculate; petiole $\frac{1}{3}$ – $\frac{1}{2}$ the leaf length; stem scales to 13 mm long; veins 1 mm apart; lamina scales linear, orange-tan 96. *E. quitense*

o. Leaves 2–16 cm long; lamina scales 1–2(3) mm long i2

i2. Lamina ovate to lanceolate, 1.4–2.7 cm wide, cuspidate or rarely acuminate j2

j2. Lamina truncate to subcordate at base; petiole and lamina conspicuously scaly 90. *E. pilosius*

j2. Lamina broadly cuneate to rounded at base; petiole and lamina sparsely scaly to glabrous k2

k2. Lamina sparsely scaly, minute glandular trichomes sparse 56. *E. lindenii*

k2. Lamina lacking scales but with abundant minute glandular trichomes, especially at lamina base and upper petiole 109. *E. tambillense*

i2. Lamina linear to spatulate, 0.4–1.0 cm wide, obtuse l2

l2. Lamina linear-elliptic; leaves 7–13 cm long 42. *E. horridulum*

l2. Lamina obovate-ob lanceolate to narrowly elliptic; leaves 2–4(–8) cm long m2

m2. Fertile lamina narrowly oblanceolate, much longer than broad, often inrolled, base cuneate 46. *E. hieracioides*

m2. Fertile lamina orbicular to ovate, flat or conduplicate, base rounded, rarely cuneate n2

n2. Leaves 2–4(6) cm long; sterile lamina spatulate; fertile lamina rounded, strongly conduplicate, with distinctly darker scales than those of sterile leaf; hydathodes very inconspicuous to lacking 89. *E. piloselloides*

n2. Leaves 7–15 cm long; sterile lamina elliptic to oblong; fertile lamina orbicular, flat, with scales same color as those of sterile lamina; hydathodes evident 38. *E. hayesii*

a. Sterile leaf densely scaly to virtually glabrous; scales various (broadly lanceolate or ovate, ciliate, stellate, round-peltate) but not subulate; hydathodes lacking (except in *E. mathewsi* and *E. hartwegii*) o2

o2. Scales, stellate trichomes, or glandular dots present on lamina and petiole; if lamina scales sparse, lamina chartaceous, not coriaceous p2

p2. Lamina scales limited to margin and midvein, laminar surface lacking any form of scale (including resinous dots) q2

q2. Lamina scales golden, round, entire; petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length; sterile lamina cuspidate 21. *E. decoratum*

q2. Lamina scales tan-orange, lanceolate, deeply dentate; petiole $\frac{1}{8}$ – $\frac{1}{6}$ the sterile leaf length; sterile lamina broadly obtuse 35. *E. obtusum*

p2. Lamina scales not limited to margin and costa, with some form of scale, although perhaps very sparse, on the laminar surface r2

r2. Abaxial surface with stellate trichomes and/or resinous dots s2

s2. Abaxial surface with stellate trichomes, sometimes mixed with resinous dots, or with small, loosely attached scales with resinous dots t2

t2. Abaxial surface with scales, stellate trichomes rare or lacking u2

u2. Stem compact; stem scales reddish black, indurated, ascending; petiole $\frac{1}{3}$ the sterile leaf length 70. *E. nastukiae*

u2. Stem long-creeping; stem scales black, thin, recurved; petiole $\frac{1}{2}$ – $\frac{3}{2}$ the sterile leaf length v2

v2. Leaves 2–3.5 cm long, ovate-acuminate; lamina scales lanceolate, long-ciliate 45. *E. jucundum*

v2. Leaves 15–35 cm long, narrow-elliptic; lamina scales ovate, linear or linear-lanceolate, entire or ciliate only at scale base w2

w2. Lamina scales ovate (or ovate-deltate to ovate-lanceolate), entire; petiole scales imbricate 95. *E. punae*

w2. Lamina scales linear adaxially, linear-lanceolate abaxially, short-ciliate at scale base; petiole scales scattered 59. *E. longius*

t2. Abaxial lamina surface with stellate trichomes (rarely just resinous dots; see couplet y2) x2

x2. Scales of petiole and costa (and adaxial lamina surface) round, fimbriate; those of petiole and abaxial costa often bicolorous (dark-centered with white fringe) y2

y2. Abaxial surface with stellate trichomes 110. *E. tectum*

y2. Abaxial surface with resinous dots 107. *E. stenophyllum*

x2. Scales of petiole and lamina (especially abaxial costa) lanceolate to roundish or stellate, neither conspicuously round and fimbriate nor bicolorous, though some may be dark and araneiform z2

z2. Lamina narrowly elliptic, 6–19 mm wide; costa and petiole with some dark appressed araneiform scales 6. *E. angustius*

z2. Lamina linear to narrow-elliptic, 4–6(–9) mm wide; costa and petiole scales stellate to lanceolate, lacking dense, araneiform scales a3

a3. Lamina and petiole scales with noticeable scale body, adaxial scales peltate, round to ovate; abaxial scales all stellate; petiole with linear-lanceolate scales 94. *E. pumilio*

a3. Lamina and petiole scales on both surfaces all stellate b3

b3. Adaxial lamina indument strictly stellate trichomes; fertile leaf shorter than sterile; petiole ca. 0.5 mm diameter, $\frac{1}{3}$ – $\frac{1}{2}$ sterile leaf length; sterile leaves 9–13(–30) cm long, 4–20 mm broad; terrestrial, at 1500–3650 m 112. *E. tenuiculum*

b3. Adaxial lamina indument with slight scale body in center;

fertile leaf longer than sterile; petiole 0.6–0.9 mm diameter,
 ca. $\frac{1}{5}$ the sterile leaf length; sterile leaves 7.5–10 cm long, 2.5–
 3 mm broad; epiphytic, at 900–1300 m 46. *E. killipii*

s2. Abaxial lamina surface with resinous dots, lacking scales and stellate trichomes c3

c3. Lamina elliptic, 60–75 cm long, 3.4–4.6 cm wide; stem compact 19. *E. craspedotum*

c3. Lamina linear to narrowly elliptic, 12–44 (to 78 in *E. ciliatum*) cm long, 0.8–
 2.3(–3.0) cm wide; stem short-creeping d3

d3. Lamina subsessile, $\frac{1}{30}$ – $\frac{1}{5}$ the sterile leaf length; veins conspicuous, 2 mm
 apart 72. *E. nigrescens*

d3. Lamina distinctly petiolate, $\frac{1}{4}$ – $\frac{2}{3}$ the sterile leaf length; veins inconspicuous,
 ca. 1 mm apart e3

e3. Lamina long-cuspidate or acuminate (rarely obtuse); adaxial lamina
 surface with scattered to abundant hair-toothed scales 88. *E. petiolosum*

e3. Lamina narrowly obtuse to acute; adaxial lamina scales entire to erose
 or with only short teeth f3

f3. Lamina nearly scaleless above with only scattered 1 mm scales,
 especially near margin; 400–2650 m elev. g3

g3. Stem long-creeping, naked, glutinous; phylloodia long; epi-
 phytic at 400–2650 m 17. *E. ciliatum*

g3. Stem short-creeping; phylloodia short; terrestrial at 2050–
 3200 m 43. *E. huacsaro*

f3. Lamina scaly adaxially, usually densely so, scales deltate-lanceolate,
 often bicolorous, ca. 2 mm long; 3200–5100 m elev. h3

h3. Lamina scales entire to erose 37. *E. hartwegii*

h3. Lamina scales denticulate, ciliate, at least at base 62. *E. mathewsi*

r2. Abaxial surface with round to lanceolate scales (often glabrous in *E. mathewsi*, *E. hartwegii*, and *E. litanum*), lacking stellate trichomes and resinous dots i3

i3. Abaxial surface with round, ciliate, peltate scales; stem scales weakly dentate to
 entire j3

j3. Scales of abaxial surface white, irregular, round, peltate to ovate, variably dentate
 to ciliate; petiole and abaxial costa scales pale, concolorous; lamina narrowly
 cuneate at base, apex long-acuminate; stem compact, petioles approximate 47. *E. laminariooides*

j3. Scales of abaxial surface mostly reddish, scattered, dark; petiole and abaxial
 costal scales black with white, fimbriate margin; lamina broadly cuneate at base,
 apex cuspidate to acuminate; stem creeping, petioles 0.5–2 cm apart 20. *E. cuspidatum*

i3. Abaxial surface with lanceolate, cilio-denticulate scales; adaxial the same or gla-
 brous; stem scales strongly cilio-denticulate k3

k3. Lamina linear, 30–45 cm long, 0.4–0.6(–1.0) cm wide 13

13. Abaxial lamina scales long-ciliate (cilia longer than scale body is wide),
 appearing as a dense, woolly mat; lamina 5–10 mm wide 16. *E. chloödes*

13. Abaxial lamina scales short-ciliate (cilia much shorter than scale body is
 wide), appressed, not a woolly mat; lamina 4–5 mm wide 115. *E. vittariooides*

k3. Lamina elliptic to narrowly elliptic, 1–6 cm broad m3

m3. Lamina scales undivided (entire, erose to denticulate), not long-ciliate
 along scale margin, although sometimes ciliate at base, generally dark with
 pale margin n3

- n3. Stem long-creeping; abaxial lamina surface densely scaly 99. *E. rosenstockii*
- n3. Stem short-creeping; abaxial lamina surface lacking scales See couplet h3
- m3. Lamina scale margins ciliate or coarsely dentate o3
- o3. Stem long-creeping, petioles mostly 5–20 mm apart p3
 - p3. Lamina scales dense, imbricate, surface not or barely visible; lamina lanceolate, long-acuminate 55. *E. leprosum*
 - p3. Lamina scales scattered to sparse, surface visible; lamina elliptic to linear-elliptic, apex obtuse to acuminate q3
 - q3. Leaves 55–86 cm long, 3.5–5.6 cm broad; abaxial lamina lacking scales other than sparse, lanceolate ones along costa; lamina margin with dense orange scales 0.5–1 mm long 5. *E. amplum*
 - q3. Leaves less than 53 cm long, mostly less than 35 cm long, 2.0–4.1 cm broad; abaxial lamina surface scaly, margin not densely orange-scaly r3
 - r3. Stem 2–3 mm in diameter s3
 - s3. Stem scales strongly dentate .. 53. *E. laxisquama*
 - s3. Stem scales entire to sparsely denticulate t3
 - t3. Phylloodia 2–3.8 cm long; lamina apex acuminate; petiole and costal scales linear-lanceolate, brown to tan, not sclerotic 32. *E. fortipes*
 - t3. Phylloodia 1.2–2.2 cm long; lamina apex acute to obtuse; petiole and costal scales black, sclerotic, usually appressed ... 116. *E. vulcanicum*
 - r3. Stem 1–2 mm in diameter u3
 - u3. Lamina 0.4–0.6 cm wide, leaf 8–16 cm long; abaxial surface scaly, scales overlapping, curled, ciliate-dentate 111. *E. tenue*
 - u3. Lamina 1.0–2.5 cm wide, leaf 14–34 cm long; abaxial surface glabrous or glandular v3
 - v3. Lamina abundantly glandular abaxially; lamina apex acuminate; petiole $\frac{1}{2}$ – $\frac{3}{5}$ the sterile leaf length See couplet u2
 - v3. Lamina eglandular; lamina apex acute to obtuse; petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length 116. *E. vulcanicum*
 - o3. Stem compact, leaves approximate, 0–2 mm apart w3
 - w3. Lamina apex acuminate, or if only acute, stem scales with widely spreading, long, hairlike teeth x3
 - x3. Stem scales maroon, linear, 12–20 mm long y3
 - y3. Lamina scales imbricate, appressed; lamina 25–36 cm long; petiole scales appressed to ascending; 1100–2750 m elev. 29. *E. erythrolepis*
 - y3. Lamina scales loosely arranged; lamina (30)–52–66 cm long; petiole scales widely spreading; 3400–3750 m elev. 101. *E. ruficomus*
 - x3. Stem scales orange to black, linear-lanceolate to lanceolate, 1–6 mm long, often with hairlike teeth z3
 - z3. Petiole $\frac{1}{20}$ – $\frac{1}{6}$ ($\frac{1}{4}$) the sterile leaf length a4
 - a4. Lamina apex abruptly long-acuminate; stem scales

1 mm long, brown, entire, somewhat resinous; stem 2 mm in diameter 63. *E. megalurum*

a4. Lamina gradually diminishing at apex; stem scales 4–7 mm long, orange to orange-tan or dark brown, long-ciliate or entire; stem 5–10 mm in diameter b4

b4. Stem scales dark reddish brown, very indurated, entire; stem ca. 5 mm in diameter; sterile lamina glabrous abaxially, costa with minute, ciliate scales, glabrescent adaxially except for dense, cilio-denticulate, 1 mm long, pale scales at margin 58. *E. litanum*

b4. Stem scales orange to orange-tan, thin, long-ciliate; stem ca. 10 mm in diameter; lamina densely ciliate-scaly on both surfaces c4

c4. Lamina apex acute, the scales lanceolate, 6–12 cells wide; petiole terete 91. *E. plumosum*

c4. Lamina apex acuminate, the scales skeletonized, 3 cells wide, petiole flattened 9. *E. auricomum*

z3. Petiole $\frac{1}{4}$ – $\frac{2}{3}$ sterile leaf length or, if shorter, at least some petioles of the same plant longer d4

d4. Stem scales orange to black, entire or weakly provided with lax, hairlike teeth e4

e4. Stem scales with lax, tan trichomes; lamina scales appressed 79. *E. orbignyanum*

e4. Stem scales entire; lamina scales loose 40. *E. hickenii*

d4. Stem scales black, with stiff, black, hairlike teeth f4

f4. Lamina elliptic; costal scales orange 83. *E. paleaceum*

f4. Lamina linear-elliptic; costal scales black g4

g4. Lamina scales dense; costal scales lanceolate, 2–3 mm long 98. *E. rimbachii*

g4. Lamina scales scattered; costal scales arachnidoid, 0.5–1 mm long 36. *E. guamanianum*

w3. Lamina apex obtuse to acute, stem scales entire to weakly dentate or with long-ascending hairlike teeth h4

h4. Lamina (10–)14–33 mm broad, with orange to maroon scales i4

i4. Abaxial lamina scales black, appressed 7. *E. atropunctatum*

i4. Abaxial lamina scales orange (or black only on costa), loosely arranged j4

j4. Leaves 65–70 cm long, 5.5–6 cm broad; fertile leaf linear 22. *E. dichroum*

j4. Leaves 17–47 cm long, 1.4–2.7 cm broad; fertile leaf elliptic k4

k4. Larger petiole scales long-ciliate 26. *E. engelii*

k4. Larger petiole scales erose to very short-ciliate	14
14. Lamina scales scattered, greatly reduced, sometimes nearly to stellate trichomes; costal scales black; petiole scales black with white margin	76. <i>E. oculatum</i>
14. Lamina scales abundant; petiole and costal scales concolorous, orange-tan	69. <i>E. muscosum</i>
h4. Lamina 4–12 mm wide, or if broader (to 22 mm), with black stem scales	m4
m4. Stem scales castaneous to dark red-brown	n4
n4. Lamina 4–7 mm wide; costal and laminar scales linear-lanceolate, laminar ones with hairlike teeth much longer than scale body is wide	113. <i>E. tomentellum</i>
n4. Lamina 6–12 mm wide; costal scales ovate to lanceolate, ciliate, black, lightly appressed, the hairlike teeth about half as long as scale body is wide	49. <i>E. lasioglottis</i>
m4. Stem scales black	o4
o4. Lamina narrowly elliptic, 8–15 mm broad; laminar scales erect, nearly round with cilia longer than scale body	48. <i>E. lanatum</i>
o4. Lamina elliptic, 12–22 mm wide; laminar scales appressed, imbricate, lanceolate, erose to short-ciliate	73. <i>E. nivosum</i>
o2. Scales lacking on lamina and petiole except rarely some minute, stellate trichomes or a few scales at petiole base; if lamina scales generally distributed abaxially or along margin, lamina very coriaceous; stem and lamina scales not regularly dentate, only occasional processes or weak trichomes along margin	p4
p4. Stem 4–10 mm in diameter	q4
q4. Lamina nearly sessile, petiole less than $\frac{1}{10}$ the sterile leaf length	r4
r4. Lamina coriaceous, with scales, especially toward lamina base and petiole; fertile lamina 3–3.6 cm wide	60. <i>E. luridum</i>
r4. Lamina chartaceous, this and petiole lacking scales; fertile lamina 2–2.8 cm wide	s4
s4. Lamina 4.0–5.2 cm wide, apex acute; petiole of sterile leaf ca. 1 cm long; stem scales orange; fertile lamina 2 cm wide	71. <i>E. nidiformis</i>
s4. Lamina 1.9–2.4 cm broad, apex acuminate; petiole of sterile leaf 2–3(–6) cm long; stem scales dark brown; fertile lamina 2.3–2.8 cm broad	52. <i>E. lawyerae</i>
q4. Lamina elliptic, with distinct petiole $\frac{1}{8}$ or more the sterile leaf length	t4
t4. Lamina surface abaxially with conspicuous reddish brown, skeletonized scales; lamina very coriaceous, blue-green adaxially when fresh	66. <i>E. metallicum</i>
t4. Lamina surface abaxially lacking conspicuous scales; lamina chartaceous to coriaceous, not distinctly blue-green when fresh	u4
u4. Stem erect, a slender trunk 30–90 cm long; petiole $\frac{1}{8}$ – $\frac{1}{4}$ the sterile leaf length; lamina oblanceolate	54. <i>E. lechlerianum</i>
u4. Stem horizontal; petiole $\frac{1}{4}$ or more the sterile leaf length; lamina elliptic or linear	v4
v4. Stem long-creeping; lamina punctate with glands or stellate trichomidia	w4

w4. Abaxial lamina surface with stellate trichomidia; leaves 60–75 cm long; fertile lamina linear 118. *E. williamsiorum*

w4. Abaxial lamina surface with glandular dots, sometimes with adhering spores making them appear black; leaves 25–41 cm long; fertile lamina elliptic, similar in size and shape to the sterile 64. *E. meladenium*

v4. Stem compact to moderately creeping x4

 x4. Lamina linear, 1.8–2.1 cm wide; stem scales orange and on petiole beyond phyllopodia 114. *E. velongum*

 x4. Lamina elliptic to ovate-lanceolate, 4.9–15 cm wide; stem scales dull brown to blackish, rarely orange, not covering phyllopodia y4

 y4. Lamina ovate-lanceolate, 9–15 cm wide, abaxial surface with fine, dissected, hairlike scales along costa 81. *E. pachyphyllum*

 y4. Lamina elliptic, 4.9–9.8 cm wide, abaxial surface glabrous or with occasional lanceolate scales along costa near lamina base 51. *E. latifolium*

p4. Stem 1–3(–4) mm in diameter z4

 z4. Stem long-creeping, petioles often over 1 cm apart a5

 a5. Stem 1–1.5 mm in diameter; stem and petiole scales tan; leaves 2–11 cm long; phyllopodia lacking b5

 b5. Lamina lanceolate-ovate to lanceolate, oblanceolate, or suborbicular, apex obtuse c5

 c5. Lamina lanceolate to ovate-lanceolate; leaves 7–12 cm long; abaxial lamina scales inconspicuous, tan, not sclerotic 106. *E. squamipes*

 c5. Lamina ovate to oblanceolate or suborbicular, 1.3–2.4(–3.5) cm long, with dark brown to black sclerotic scales, especially abaxially 18. *E. concinnum*

 b5. Lamina elliptic to narrowly lanceolate, apex acuminate d5

 d5. Leaves (9–)21–24 cm long, 1.4–2.0 cm wide; petiole scales appressed to ascending, 3–4 mm long; lamina apex acuminate; lamina scales scattered 27. *E. ensiforme*

 d5. Leaves 7–12 cm long, 0.7–1.1 cm wide; petiole scales widely spreading, 2–3 mm long; lamina apex acute to acuminate, lamina scales sparse, mostly along costa 61. *E. macilentum*

 a5. Stem (1.5–)2–3 mm in diameter; stem scales black to tan, sparse; leaves 15–38 cm long; phyllopodia present e5

 e5. Stem scales lustrous, strongly spreading, blackish brown, not sclerotic f5

 f5. Lamina lanceolate, 28–48 cm wide 65. *E. melancholicum*

 f5. Lamina linear-elliptic, 10–13 cm wide 8. *E. atrosquamatum*

 e5. Stem scales dull to lustrous, orange-tan to black, obviously sclerotic, not strongly spreading (except in *E. patinii*) g5

 g5. Stem scales lanceolate, mostly 2–3 mm long, orange-tan to dark brown, thin or sclerotic; leaf apex acute to acuminate; 1200–3500 m elev. h5

 h5. Sterile lamina ovate, 5.5–6.5 cm broad 78. *E. oöphyllum*

 h5. Sterile lamina elliptic to lanceolate or oblanceolate, 1.7–5.5 cm broad i5

 i5. Sterile lamina linear-elliptic, 1.7–2.0 cm broad; stem scales orange-tan, widely spreading 87. *E. patinii*

 i5. Sterile lamina elliptic, lanceolate or oblanceolate, 2.2–5.5 cm broad; stem scales orange-tan to black, appressed or slightly ascending j5

 j5. Abaxial lamina surface with black, coarsely dentate scales and/or conspicuous, black, stellate trichomidia 77. *E. odontolepis*

j5. Abaxial lamina surface glabrous or with minute trichomidia inconspicuous to the naked eye 34. *E. glossophyllum*

g5. Stem scales deltate to lanceolate, 0.5–1.5 mm long, black, sclerotic; leaf apex obtuse or long-acuminate; 300–2200 m elev. k5

 k5. Lamina narrowly elliptic, chartaceous, apex long-acuminate, base attenuate 4. *E. amphioxys*

 k5. Lamina ovate to lanceolate or oblong, coriaceous, apex obtuse to acute, base narrowly to broadly cuneate 57. *E. lingua*

z4. Stem short-creeping or compact; petioles generally 1–5 mm or less apart, rarely 1 cm apart 15

 l5. Lamina very broadly lanceolate, 50–100 cm long, (5.5)9–15 cm broad; lamina base usually broadly rounded 81. *E. pachyphyllum*

 l5. Lamina linear, elliptic or oblanceolate, less than 42 cm long, 5 cm broad; lamina base cuneate to attenuate m5

 m5. Lamina apex broadly obtuse; lamina obovate, margin with dissected orange scales 74. *E. obovatum*

 m5. Lamina apex narrowly obtuse to acuminate or cuspidate; lamina elliptic to linear or narrowly oblanceolate; scales lacking to lightly distributed abaxially, not concentrated on margin n5

 n5. Lamina margin much thickened or inrolled, lamina lanceolate-acuminate to obovate-obtuse-cuspidate, lustrous, glabrous, or with scattered stellate trichomidia; stem scales orange, linear, with irregular processes 108. *E. styriacum*

 n5. Lamina margin not thickened, dull below, lamina linear to elliptic or oblanceolate o5

 o5. Lamina linear or linear-elliptic, 5–10(16) mm wide p5

 p5. Stem scales concolorous, black to dark brown, often with marginal row of light brown cells; lamina glabrous 32. *E. glabellum*

 p5. Stem scales tan or with varying degrees of black streaks; lamina minutely punctate, rarely with small stellate trichomes like tufts of wool 67. *E. minutum*

 o5. Lamina elliptic or oblanceolate, (16–)20–48 mm wide q5

 q5. Lamina oblanceolate; leaf nearly sessile, petiole ca. $\frac{1}{20}$ the leaf length 31. *E. flaccidum*

 q5. Lamina elliptic; leaf distinctly petiolate; petiole $\frac{1}{5}$ – $\frac{1}{2}$ the leaf length r5

 r5. Stem scales reddish orange; lamina abruptly decurrent; petiole about half the sterile leaf length 23. *E. discolor*

 r5. Stem scales dark brown; lamina abruptly to gradually narrowed at base s5

 s5. Lamina elliptic to broadly so, 2.7–4.8(–7.5) cm broad, abruptly (to gradually) narrowed and slightly decurrent at base; petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length 25. *E. elegantipes*

 s5. Lamina narrowly elliptic, 1.6–2.5 cm broad, gradually tapering at base; petiole $\frac{1}{5}$ the sterile leaf length 32. *E. glabellum*

1. *Elaphoglossum albescens* (Sodiro) Christ,
Monogr. *Elaphoglossum* 123. f. 68. 1899.

de Lloa, *Sodiro* (not located); cerca de Chillan, *Sodiro* (not located).

Acrostichum albescens Sodiro, Recens. crypt. vasc.
Quit. 75. 1883. SYNTYPES: Ecuador, en el valle

Stem creeping, 3–4 mm in diameter, with white blotches on it, the petiole and the lamina scales

linear, lustrous, blackish maroon, 2–3 mm long, entire or with sparse teeth. **Phyllopodia** lacking. Leaves slightly apart, 16–40 cm long, 2.2–3.7 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{2}{3}$ the sterile leaf length, scales linear, dark (or with pale tip), lustrous, to 4 mm long, minutely serrulate, appressed to ascending. **Lamina** elliptic, chartaceous, apex acuminate to caudate, base broadly cuneate to rounded. **Veins** obscure, ca. 1 mm apart, at 70–80 degree angle. **Hydathodes** present. **Lamina scales** linear, brown, lustrous, to 3 mm long, scattered on laminar surface, to 5 mm on margin, more abundant on margin. **Fertile leaves** longer than the sterile, petiole $\frac{4}{5}$ the fertile leaf length, scales black and with more pronounced teeth, scales black on costa and mixed with the sporangia.

Terrestrial and epiphytic in wet forest, 1700–3450 m, Amazonas, San Martín, Huánuco, Cuzco. Colombia; Ecuador; Peru.

Although the material cited here is relatively uniform, there are a few specimens that do not fit well into this species. For example, *Young 1950* (USM) (San Martín: Mariscal Cáceres) has the petiole subglabrous but with scattered black scales, the lamina is adaxially glabrous and abaxially with scales scattered, black, lanceolate, 2–3 mm long. Further, *Plowman & Davis 4802* (GH) (Cuzco: La Convención) has petiole with scales dark, more or less appressed, the leaf is very large (to 64 cm long, 9.5 cm broad) with scales dark, 1.5–2 mm long. These may represent distinct species. There are additional variations from Ecuador. More study is needed of *E. albescens* throughout its range to determine how many taxa might be recognized in this complex.

Amazonas: Chachapoyas, Cerros Calla Calla, on road to Leimebamba, *Hutchinson & Wright 5797* (F, GH in part, MO, P, UC, US). **San Martín:** Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, *Young 4462* (USM). **Huánuco:** Muña, *Bryan 549* (F). **Cuzco:** La Convención, Valle de Santa Ana, above Quillabamba, *Plowman & Davis 4802* (GH).

2. *Elaphoglossum alipes* Mickel, sp. nov.

Inter species squamis subulatis provisis stipite alato unicum.

Stem short-creeping, 2–3 mm in diameter, scales linear-deltate, lustrous, blackish maroon, 1.5–2 mm long, entire. **Phyllopodia** lacking. Leaves 1–2 mm apart, 18–26 cm long, 2.7–3.9 cm broad. Pet-

ole lacking. **Lamina** oblanceolate, membranous, apex acute, base narrowed to a wing about $\frac{1}{3}$ the sterile leaf length. **Veins** evident, free, 1.5–2 mm apart, at 70 degree angle. **Hydathodes** present. **Lamina scales** scattered on both surfaces, subulate, tan, 2 mm long on surfaces, 3 mm long on margin. **Fertile leaves** unknown.

TYPE—Peru, Ucayali (as Loreto), along Río Aguetia (Aguaytía) above mouth of Quebrada Yurac-Yacu, 2 Oct 1972, *Croat 20857* (holotype, UC!).

Endemic. Epiphytic in wet forest, no elevation given, Ucayali.

The winged petiole, subulate scales, and white lamina patches distinguish this species.

Thus far known only from the type.

3. *Elaphoglossum amazonicum* Atehortua ex Mickel, sp. nov.

Ab affinibus rhizomate crasso, rhizomatis paleis flexuosis, laminis sterilibus latioribus apice cuspidatis, sporisque spinulosis differt.

Stem compact, horizontal to erect, 1–2 cm in diameter, scales linear-lanceolate, fulvous, concolorous, to 15 mm long, lustrous, 0.5 mm broad, crispat to very flexuous toward the tip. **Phyllopodia** present, 1.5 cm long, dark brown, aero-phores bilateral to the phyllopodium like a long strip, and visible even in dry specimens but totally covered with dense mass of scales. Leaves fasciculate, 45–95 cm long, 7.5–10 cm broad. **Petiole** of sterile leaf 2–10 cm long, conspicuously winged, stout, terete but abaxially deeply canaliculate, 0.4 mm in diameter, densely scaly, scales subulate, 0.8 mm long, fulvous to brown-ferruginous toward the costa, also with minute, short, resinous, capitate, glandular trichomes on the petiole and costa. **Lamina** oblanceolate, chartaceous to subcoriaceous, apex acuminate to abruptly long-cuspidate, base attenuate. **Veins** 1–2 mm apart, at 45 degree angle to costa. **Hydathodes** lacking; costa prominent on the abaxial side and densely scaly. **Lamina scales** lacking (at least in dry specimens) except on the costa and margin, but lamina densely covered with appressed, yellow, branched, glandular trichomes, which are usually oriented toward the margin, margin hyaline, densely covered with 2–3 rows of fine, orange to yellow, subulate scales similar in size and shape to those that cover the costa, and mixed with erect, capitate, glandular trichomes. **Fertile leaf** shorter than the sterile but

with a longer petiole (3–8.5 cm long), lamina narrowly lanceolate, 25–50 cm long, 2.3–4.0 cm broad, apex acuminate, base attenuate, the petiole becoming winged proximally; intersporangial scales lacking. Spores 25.4–31.5 μm long with narrow, short, spiculate ridges.

TYPE—Peru, San Martín, Zepelacio, near Moyobamba, Oct–Nov 1933, *Klug 3330* (holotype, usl; isotypes, BM!, MO!, NY!).

This species is very closely related to *E. raywaense* and *E. latum* (Mickel) Atehortua ex Mickel, *comb. nov.* (*E. apodum* (Kaulf.) Smith var. *latum* Mickel, Amer. Fern J. 69: 100. 1979), but differs in the flexuous scales, large size, cuspidate lamina apex, stout, fibrous petiole, and finely spinulose spores.

Underwood annotated specimens of this species (e.g., *R. S. Williams 1027*, NY) as a new species of *Elaphoglossum*, using the epithet *williamsii*, but did not publish the name. There is now an *E. williamsii* Vareschi (in sect. *Elaphoglossum*, sub-sect. *Pachyglossa*), so another epithet was needed.

San Martín: Prope Tarapoto, in monte Campana, Peruvia orientalis, *Spruce 4639* (BM). **Junin:** Jauja, Satipo, Monte Alto margen del río, *Ridoutt 11562* (us). **Cuzco:** Ccochayoc, *Bües 1737* (us).

4. *Elaphoglossum amphioxys* Mickel, *sp. nov.*

Rhizome gracillimo squamis scleroticis nigris induito necnon lamina utrinque attenuata nuda inter affines singula.

Stem long-creeping, 1.5–2 mm in diameter, scales scattered, ovate to lanceolate, dull to lustrous, sclerotic, orange to black, ca. 1 mm long, subentire. **Phylloodia** present. **Leaves** 1–3 cm apart, 18–31 cm long, 2.0–4.3 cm broad. **Petiole** about $\frac{1}{3}$ the sterile leaf length, glabrous. **Lamina** lanceolate to narrowly elliptic, chartaceous, apex long-acuminate, base attenuate. **Veins** obscure, free, 1 mm apart, at ca. 80 degree angle. **Hydathodes** lacking. **Lamina scales** lacking, but surface punctate with resinous dots or substellate trichomes. **Fertile leaves** equal to or slightly shorter than the sterile, petiole $\frac{1}{2}$ – $\frac{3}{5}$ the leaf length, lamina narrowly lanceolate; intersporangial scales lacking.

TYPE—Peru, Ucayali (as Loreto), Chacra de Cesar Vela SE of granja del Sr. Parrera (Aguaytía), Coronel Portillo, Padre Abad, *J. Schunke V. 5493b* (holotype, NY!).

Endemic. Epiphytic in wet forests, 295–800 m, Amazonas, Ucayali, Huánuco, Junín, Cuzco, Madre de Dios.

Elaphoglossum amphioxys is allied to *E. lingua* but is distinct by the slender lamina that is attenuate at both ends.

Amazonas: Chachapoyas, cerro Puma Urco, *Soukup 4089* (us). **Huánuco:** SW slope of Río Llullapichis watershed, *Dudley 13331* (us). **Junín:** Prov. Tarma, Tarma-La Merced road, *Skog et al. 5021* (us). **Cuzco:** Paucartambo, Cosñipata Valley, Río Tono, ridge on road N of Patria, *Wachter 168* (F, GH). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palota, 10–15 km NNW of Shin-tuya, *Foster 10755* (F, GH).

5. *Elaphoglossum amplum* Mickel, *sp. nov.*

Rhizome elongato repenti necnon lamina magna marginem versus squamulis minutis induta distinguenda.

Stem compact, horizontal, 2–5 mm in diameter, scales linear-lanceolate, lustrous, dark brown, 1–2 mm long, with short, patent teeth. **Phylloodia** evident but hidden by scales. **Leaves** 0.5–1 cm apart, 55–86 cm long, 3.5–5.6 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, scales linear, dark brown to tan, appressed to ascending, 2–3 mm long, with short, patent teeth, **lamina** narrowly elliptic, chartaceous, apex acuminate, base broadly cuneate. **Veins** evident, free, 1.5–2 mm apart, at ca. 80 degree angle. **Hydathodes** lacking. **Lamina scales** abaxially scattered, round-peltate, ciliate, margin with dense orange scales 0.5–1 mm long, costa scales appressed, tan, dentate, 0.5–2 mm long, adaxial surface punctate with minute stellate trichomidia. **Fertile leaves** longer than the sterile, petiole $\frac{3}{4}$ the fertile leaf length, lamina linear, 1.8–2.0 cm broad; intersporangial scales lacking.

TYPE—Peru, Cuzco, Quillabamba, Santa Teresa, Mandornilloc, 0.5 km W of La Playa, *Peyton & Peyton 1246* (holotype, GH!).

Endemic. Terrestrial in wet forests, 2390–2700 m, Huánuco, Pasco, Cuzco.

In the creeping stem and long leaves it superficially resembles *E. williamsiorum* but differs from that species in having dentate, recurved stem scales, marginal dentate lamina scales, and linear fertile lamina.

Huánuco: Muña, *Bryan 547a* (F). **Pasco:** Oxapampa, SW of Oxapampa on road to María Teresa & Llaupi, *Foster 7617* (F). **Cuzco:** Urubamba, Machu Picchu, 0.5

km N of union of Sayacmarca & Aobamba Rivers, *Peyton & Peyton 1460* (GH).

6. *Elaphoglossum angustius* Mickel, sp. nov.

Ab *E. tenuicolo* stipite paleis nigris araneiformibus obsito laminaque majori diversa.

Stem short-creeping, 2–4 mm in diameter, scales linear, blackish maroon to castaneous with tortuous hair tip, ca. 3 mm long, subentire. **Phylloodia** distinct. Leaves fasciculate, 15–46 cm long, 0.6–1.9 cm broad. **Petiole** $\frac{1}{6}$ – $\frac{1}{3}$ the sterile leaf length, scales 1–2 mm long, some ascending, these sparse, linear-lanceolate, dark, sparsely dentate, ca. 2 mm long, mostly stellate and appressed, also some dark, appressed and arachnoid. **Lamina** narrowly elliptic, apex acuminate to caudate, base cuneate. **Veins** obscure, free, ca. 1 mm apart, at 60–70 degree angle. **Hydathodes** lacking. Abaxial **lamina scales** stellate, scattered, those on adaxial surface often with slight body or surface glabrescent. **Fertile leaves** longer than the sterile, petiole $\frac{1}{2}$ – $\frac{2}{3}$ the fertile leaf length, lamina narrower than the sterile; intersporangial scales lacking.

TYPE—Peru, San Martín, Zepelacio, near Moyobamba, *Klug 3503* (holotype, NY!; isotypes, F!, GH!, K!).

Endemic. Epiphytic in wet forests, (100) 900–2300 m, Amazonas, San Martín, Loreto, Lima, Junín, Ucayali, Cuzco.

This is related to *E. tenuiculum* but differs in the larger leaves, petiole and abaxial costa often with black araneiform scales, and the scales of the adaxial lamina surface with a slight scale body, not strictly stellate trichomes. Occasionally the stellate trichomes are gland-based, as in *J. Schunke 369* and *Saunders 1247*.

Amazonas: Mendoza, *Woytkowski 8141* (GH). **Loreto:** Gamitanacocha, *J. M. Schunke 14264* (us). Maynas, Gamitanacocha, Río Mazán, *J. M. Schunke 369* (F, GH, NY, UC). **Lima:** Canta, Huamantanga, 4 km on road to Huamantanga from Lima–Canta road, *Saunders 1247* (F). Canta, 1 km on same road, *Saunders 1238* (GH). **Junín:** Chanchamayo valley, *C. Schunke 1349* (F), 1453 (F). Chanchamayo, *C. Schunke Aug. 1908* (F, GH). San Ramón, *Killip & Smith 24772* (NY). **Ucayali** (as Loreto); Río Aguaytía, *Croat 20904* (UC). **Cuzco:** Machu Picchu, road to ruins, *León 460* (F). Rio Marcapato, 60 km above Quincemil, *Madison 1010*, in part (GH), 1010 (GH).

7. *Elaphoglossum atropunctatum* Mickel, sp. nov.

Ab *E. oculato* laminae facie abaxiali paleis appressis nigris obsita abstans.

Stem compact, horizontal, ca. 5 mm in diameter, scales linear-lanceolate, dull orange, with dark center, 4–7 mm long, dentate. **Phylloodia** evident, often under scales. **Leaves** approximate, 18–30 cm long, 2.0–3.2 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{2}{5}$ the sterile leaf length, with scales ovate-lanceolate, erose-denticulate, orange-tan scales, 3–5 mm long, and also some smaller, appressed scales with dark center. **Lamina** narrowly elliptic, coriaceous, apex obtuse, base broadly cuneate. **Veins** obscure, free, ca. 1 mm apart, at ca. 70 degree angle. **Hydathodes** lacking. **Lamina scales** abaxially ovate to lanceolate, black, with pale hair-teeth, 1 mm long, scattered to dense, with round peltate ones ca. 0.5 mm long between the larger ones, adaxially ovate to lanceolate, white, cilio-denticulate, 1–2 mm long. **Fertile leaves** unknown.

TYPE—Peru, Pasco, Oxapampa, 2–4 km N of Mallampampa, *D. Smith & Canne 5835* (holotype, MO!).

Endemic. Epiphytic or terrestrial on organic matter in wet forest, 2200–2400 m, Huánuco, Pasco, Junín.

This species is distinct from *E. engelii* by the erose-denticulate petiole scales, and from *E. muscosum* and *E. oculatum* in the dense, dark, appressed scales on the abaxial lamina surface.

Huánuco: Carpish, *Coronado 74* (us). **Pasco:** Oxapampa, 2–4 km N of Mallampampa, *D. Smith & Canne 5861* (MO). **Junín:** Prov. Tarma, Tarma-La Merced, *Skog et al. 5023* (us).

8. *Elaphoglossum atrosquamatum* Mickel, Brittonia 39: 315. 1987. **TYPE:** Venezuela, Tachira, faldas debajo del Páramo de Tama, cerca de la frontera Colombo-Venezolana, *Steyermark, Dunsterville & Dunsterville 98348-A* (holotype, NY!; isotype, MO!).

Stem long-creeping, ca. 2 mm in diameter, scales spreading, linear-lanceolate, blackish brown, very indurated, lustrous, 6–8 mm long, margin entire. **Phylloodia** present. **Leaves** 0.5–1.5 cm distant, sterile ones 5–20.5 cm long, 1.0–1.3 cm wide. **Petiole** ($\frac{1}{5}$) $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, scales sparse

to lacking (deciduous), spreading, lanceolate, dark brown, lustrous, 2–4 mm long, margin entire or with a few long hairlike processes. **Lamina** narrowly elliptic, coriaceous, apex acuminate, base narrowly cuneate, margin distinctly revolute. **Veins** mostly obscure, 1 mm apart, at 70–80 degree angle. **Hydathodes** lacking. Abaxial **lamina scales** scattered, linear-deltate, black to brown, lustrous, 0.5–2 mm long, often hastate, margin subentire or with long, hairlike processes and surface with orange stellate trichomidia, adaxial surface glabrous or with costal scales sparse, black, as on abaxial surface. **Fertile leaves** about equal to the sterile in size and shape, petiole $\frac{1}{3}$ – $\frac{1}{2}$ the fertile leaf length; lamina scales present only along the costa.

Terrestrial (epiphytic and epipetric in Venezuela) in wet forest, 3500–4000 m, San Martín, Ancash.

Venezuela; Colombia; Peru.

The slender, long-creeping stem with recurved, black scales and the narrowly elliptic lamina with scattered black scales along the costa distinguish this species.

San Martín: Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, Chochos, *Young & Leon* 4687 (usm). **Ancash:** Carhuaz, Huascarán Nat. Park, Quebrada Ishinca, *D. Smith & Buddensiek* 11257 (F, HUT, NY).

9. *Elaphoglossum auricomum* (Kunze) Moore, Index fil. 7. 1857.

Acrostichum auricomum Kunze, Linnaea 9: 28. 1834. TYPE: Peru, Huánuco, Pampayacu, *Poeppig*, July 1829 (holotype, LZ, destroyed; isotype, Pl; photo, us of Pl).

Acrostichum cladotrichum Sodiro, Sert. fl. ecuad. 1: 9. 1905. TYPE: Ecuador, Nanegal, *Sodiro*, Sept. 1901 (holotype?, Pl; isotypes, Bl, Pl, US!).

Stem short-creeping, 3–5 mm in diameter, scales linear-lanceolate, orange, 4–7 mm long, margin with hairlike teeth. **Phylloodia** inconspicuous. **Leaves** fasciculate, 19–27 cm long, 1.4–1.6 cm broad. **Petiole** nearly lacking, ca. 1 cm long, densely clothed with spreading, orange scales 4 mm long. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base narrowly cuneate. **Veins** obscure, free, 1–2 mm apart, at 60–70 degree angle. **Hydathodes** lacking. **Lamina scales** orange, liberally distributed but not overlapping, linear, 1–4 mm long with long, hairlike teeth, the teeth at least half as long

as the scale, some scales reduced to nearly stellate trichomes. **Fertile leaves** slightly shorter than the sterile, petiole ca. $\frac{1}{3}$ the fertile leaf length, with a few stellate trichomes on the costa abaxially, lamina narrower than the sterile; intersporangial scales lacking.

Epiphytic in wet forests, 850 m, Huánuco. Mexico to Costa Rica; Colombia to Bolivia; Hispaniola.

Huánuco (as San Martín): Tingo María, *Allard* 21359 (us).

10. *Elaphoglossum bakeri* (Sodiro) Christ, Monogr. *Elaphoglossum* 132. 1899.

Acrostichum bakeri Sodiro, Recens. crypt. vasc. Quit. 77. 1883. SYNTYPES: Ecuador, Atacazo cerca de Canzacoto en la orilla del río Yamboya, *Sodiro*, (not located); Ecuador, mas abajo hasta en la zona tropical, *Sodiro* (not located).

Stem short-creeping, 4–12 mm in diameter, scales linear-lanceolate, light brown, lustrous, to 7 mm long. **Phylloodia** lacking. **Leaves** fasciculate, 70–110 cm long, 8.0–12.8 cm broad. **Petiole** about $\frac{1}{3}$ the sterile leaf length, with scales abundant, widely spreading, subulate, brown, lustrous, sparsely serrulate. **Lamina** narrowly lanceolate, chartaceous, apex short cuspidate, base broadly cuneate to rounded. **Veins** evident, free, ca. 2 mm apart, at ca. 80 degree angle. **Hydathodes** distinct. **Lamina scales** castaneous, on costa abundant, widely spreading as on petiole, 2–4 mm long, on both surfaces and margin scattered, 1–2 mm long. **Fertile leaves** longer than the sterile, petiole ca. $\frac{2}{3}$ the fertile leaf length, lamina slightly narrower than the sterile, scales appressed on costa, and scattered among the sporangia.

Terrestrial in wet forest, 2000 m, Amazonas. Costa Rica; Ecuador; Peru.

Amazonas: Prov. Bagua, ca. 20 km E of La Peca, *Barbour* 2815 (F, UC).

11. *Elaphoglossum barbatum* (Karsten) Hieron., Bot. Jahrb. Syst. 34: 553. 1904.

Acrostichum barbatum Karsten, Fl. Columb. 2: 155. t. 181. 1869. TYPE: Colombia, Bogotá, *Lindig* 111 (not located).

Elaphoglossum lindbergii var. *truncatum* Rosenst.,
Repert. Spec. Nov. Regni Veg. 25: 63. 1928.
TYPE: Bolivia, Hacienda Simaco sobre el camino
a Tipuani, Buchtien 5166 (isotype, us!).

Stem horizontal, compact, 8–16 mm in diameter, scales linear, lustrous, castaneous, 4–7 mm long, with irregular teeth near scale apex. **Phylloodia** lacking. **Leaves** fasciculate, 35–54 cm long, 4.1–10.4 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with scales spreading, blackish-maroon, ca. 5 mm long, and with abundant, erect, minute glands and appressed stellate trichomidia. **Lamina** lanceolate, chartaceous, apex acuminate to caudate, base truncate to subcordate. **Veins** barely evident, free, ca. 1 mm apart, at 70 degree angle. **Hydathodes** lacking. **Lamina scales** limited to costa, 4–5 mm long, and margin, 2–3 mm long, adaxially only on margin, both surfaces with stellate trichomidia. **Fertile leaves** slightly shorter than the sterile, the petiole ca. $\frac{1}{2}$ the fertile leaf length, the lamina nearly as broad as the sterile, base rounded to subtruncate; intersporangial scales lacking.

Epiphyte in wet forests, 2050–3250 m, Amazonas, San Martín, Huánuco, Cuzco.

Colombia; Ecuador; Peru.

Elaphoglossum barbatum is distinct from *E. erinaceum* by the truncate base and many trichomidia, even onto the upper petiole.

Amazonas: Bagua, E of La Peca, Barbour 2757 (f). **San Martín:** Mariscal Cáceres, Río Abiseo Nat. Park, Young 3394 (NY), Young & Leon 5006 (USM). **Huánuco:** Huacachi, near Muña, Macbride 4690 (f). **Cuzco:** Urubamba, Machu Picchu, Vargas 16822 (GH), Cook & Gilbert 849, 852 (US).

12. *Elaphoglossum blepharoglossum* Mickel, sp. nov.

Elaphoglossum erinaceum affinis, ab ea lamina anguste elliptica basi anguste cuneata, costa adaxialiter glabra, abaxialiter squamis subulatis nigris dense induta, margine squamis appressis 1–1.5 mm longis nigris ciliata, squamis rhizomatis fusco-aurantiacis crispis diversa.

Stem compact, 6–10 mm in diameter, scales linear-lanceolate, orange-brown, crispate, entire, ca. 10 mm long. **Phylloodia** indistinct. **Leaves** fasciculate, 46–68 cm long, 4.6–6.3 cm broad. **Petiole** ca. $\frac{1}{6}$ the sterile leaf length, scales black, subulate, 4–6 mm long, dense, patent. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base attenuate. **Veins** evident, 1–1.5 mm apart, at ca. 75 degree angle. **Hydathodes** lacking. **Lamina scales**

limited to abaxial costa, black, subulate, spreading, 2–3 mm long, and margin, black, subulate, to 1 mm long. **Fertile leaves** much shorter than the sterile (30 cm long), petiole about $\frac{1}{3}$ the fertile leaf length, lamina similar in shape to the sterile but narrower (ca. 2.4 cm); intersporangial scales lacking.

TYPE—Peru, Huánuco, Muña, 23 May–4 June 1923, Bryan 534 (holotype, f!).

Endemic. Epiphytic in dry woods, 2150 m, Huánuco.

Elaphoglossum blepharoglossum is in the *E. erinaceum* complex, with dark subulate scales and no hydathodes, but is distinct in the dense scales of the petiole and abaxial costa.

Thus far known only from the type.

13. *Elaphoglossum campolepis* Mickel, sp. nov.

Rhizome longe repenti necnon lamina lanceolata squamis fuscis curvatis instructa inter affines determinanda.

Stem long-creeping, 1–1.5 mm in diameter, scales linear, lustrous, spreading, recurved, blackish-maroon, with short, sparse (often curved) teeth. **Phylloodia** present, often indistinct or covered with scales. **Leaves** 1–3 cm apart, 6–12 cm long, 1.6–2.4 cm broad. **Petiole** about $\frac{1}{4}$ the sterile leaf length, with scales linear, blackish maroon, lustrous, spreading and recurved, sparsely serrulate, 1–2 mm long. **Lamina** lanceolate, chartaceous, apex acute to acuminate, base rounded. **Veins** indistinct, free, 1–2 mm apart, at ca. 70 degree angle. **Hydathodes** present but inconspicuous, as a pit, but not dark. **Lamina scales** on both surfaces as on petiole, strongly curved, serrulate, more concentrated on costa, straighter and longer on upper surface, 1–2 mm long abaxially, 2–3 mm long adaxially, abaxial surface also with resinous dots. **Fertile leaves** not seen.

TYPE—Peru, San Martín, Mariscal Cáceres, Río Abiseo Nat. Park, Puerta del Monte, Young 1913 (holotype, NY!; isotype, USM!).

Endemic. Terrestrial(?), above timberline, 3500 m, San Martín.

Thus far known only from the type.

14. *Elaphoglossum cardenasi* Wagner, Bull. Torrey Bot. Club 81: 62. 1954. **TYPE:** Bolivia,

Dept. Cochabamba, Prov. Chapare, about Km. 120 Cochabamba to Chimore, *Cardenas* 795 (holotype, GH!).

Stem short-creeping, 4–10 mm in diameter, scales flat, appressed, ovate-acuminate, dull brown, 2–3 mm long, entire. **Phylloodia** lacking. **Leaves** approximate, 33–39 cm long. **Petiole** $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, with scales light brown, appressed, 1–2 mm long, overlapping in lower part, scattered distally. **Lamina** pedately lobed, 14–20 cm broad, chartaceous, apex acuminate, 2–3 times basally divided lateral lobe at base of each side of lamina; margin slightly undulate, shallowly crenulate. **Veins** evident, free, 1–2 mm apart, at ca. 40–60 degree angle. **Hydathodes** evident. **Lamina scales** deltate adaxially, 0.2–0.5 mm long, abaxially consisting of squamules to stellate trichomidia, costal scales lanceolate, 0.5–1 mm long. **Fertile leaves** shorter than the sterile, petiole $\frac{4}{5}$ – $\frac{9}{10}$ the fertile leaf length, the lamina similar in architecture but smaller than the sterile lamina, 4–8 cm long, 5–10 mm broad; intersporangial scales lacking.

Epiphytic in wet forests, ca. 3050 m, Cuzco. Peru; Bolivia.

This is the best known of the dissected forms of *Elaphoglossum* (excluding *Peltapteris*). It is apparently fixed genetically as it is found in several localities. Other kinds of dissection (cresting, cruciform) are found in several species, but not with any consistency. A pedate leaf has been found in *E. simulans*, which see. I have not seen the Peruvian specimen, and conceivably it is a misidentified specimen of *E. simulans*.

Cuzco: Alturas de Sicre, Bües (cuz).

15. *Elaphoglossum castaneum* (Baker) Diels, Nat. Pflanzenfam. 1(4): 333. 1899.

Acrostichum castaneum Baker, J. Linn. Soc. Bot. 15: 166. 1877. TYPE: Ecuador in sylv. vulc. Corazón, a Bango, Sodiro, Aug 1873 (holotype, κ ; isotypes, B!, Sl!, us!).

Stem moderately creeping, 3–5 mm in diameter, scales brown to black, linear-lanceolate, lustrous, ca. 2 mm long, older parts of stem often with scattered, arched scales less than 1 mm long. **Phylloodia** lacking. **Leaves** slightly apart, 27–55 cm long, 3.0–7.8 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{2}{3}$ the sterile leaf length, glabrous except at base. **Lamina** lan-

ceolate to elliptic or ovate-lanceolate, chartaceous, apex acuminate, base cuneate to subtruncate. **Veins** inconspicuous, free, ca. 1 mm apart, at 70–80 degree angle. **Hydathodes** conspicuous. **Lamina scales** on both surfaces sparse, 0.5–1 mm long, awl-shaped, dark, lustrous. **Fertile leaves** longer than the sterile, petiole $\frac{1}{2}$ the fertile leaf length, lamina narrowly lanceolate; intersporangial scales lacking.

Terrestrial in wet forests, (750–)1950–3300 m, San Martín, Huánuco, Pasco, Cuzco.

Costa Rica; Panama; Colombia; Ecuador; Peru; Bolivia.

San Martín: Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, Puerta de Monte, Young & León 4463 (USM). **Huánuco:** Tambo de Vaca, Macbride 4451 (F, US). **Pasco:** Prov. Oxapampa, Oxapampa, van der Werff 8610 (uc). Prov. Oxapampa, San Alberto, van der Werff 8430 (uc) Oxapampa, Río San Alberto, Abra Esperanza, Foster & d'Achille 10294 (F, GH). **Cuzco:** Paucartambo, at Km 142 on Paucartambo-Manú road, Manú Nat. Park, Skog & Skog 5203 (NY, US).

16. *Elaphoglossum chloödes* Mickel, sp. nov.

Lamina linearis abaxialiter squamis aurantiacis intertextis indua recognoscenda.

Stem short-creeping, 2–3 mm in diameter, scales linear-lanceolate, lustrous, brown, ca. 3 mm long, entire. **Phylloodia** distinct. **Leaves** 1–2 mm apart, 30–45 cm long, 0.8–1.0 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, with dark brown, linear, lustrous, entire scales, at petiole base ascending, 2–3 mm long, distally appressed, tan, 0.5–1 mm long, entire. **Lamina** linear, chartaceous, apex acuminate, base attenuate. **Veins** evident, free, 1 mm apart, at ca. 70 degree angle. **Hydathodes** lacking. **Lamina scales** abaxially matted, white, peltate, round, dentate, ca. 0.5 mm across, membranous, most delicate in the genus, costal scales scattered, dark or tan, appressed as on petiole, adaxially scattered, white, flaky, ovate, entire, especially near margin. **Fertile leaves** unknown.

TYPE—Peru, Ayacucho, Ccarapa, between Huanta & Río Apurímac, Killip & Smith 22391 (holotype, NY!; isotype, US!).

Endemic. On moist banks and rotten logs in wet forests, 1500–2380 m, Amazonas, Ayacucho, Cuzco.

This forms a complex with *E. eatonianum* (E.

G. Britt.) C. Chr., of Ecuador, and *E. vittarioides*, all having a linear leaf, linear, lustrous brown stem scales, and dark-streaked costal scales.

Amazonas: Bongará, 4 km N of Pomacochas on road to Rioja, Knapp et al. 7487 (MO). **Cuzco:** Quillabamba, Santa Teresa, 0.5 km W of La Playa, Peyton & Peyton 1149 (GH).

17. ***Elaphoglossum ciliatum* (Presl) Moore, Index fil. 8: 353. 1857, based on *Olfersia ciliata* Presl.**

Acrostichum ciliatum Presl, Reliq. haenk. 1: 15. 1825, not. Desv. 1811. TYPE: Peru, ad Huánuco, Haenke s.n. (holotype, PR or PRC).

Olfersia ciliata Presl, Tent. Pterid. 234. 1836, nom. nov. (Art. 72) for *A. ciliatum* Presl, not Desv.

Acrostichum preslianum Féé, Mém. foug. 2: 46. 1845, nom. nov. for *Acrostichum ciliatum* Presl, not Desv.

Elaphoglossum preslianum (Féé) Christ, Monogr. Elaphoglossum 95. 1899.

Stem long-creeping, ca. 2–3 mm in diameter, glutinous, scales lacking except for a few resinous brown ones 1 mm long. **Phylloodia** 2–4 cm long. Leaves fasciculate, 1–10 mm apart, 26–78 cm long, 1.2–2.3 cm broad. **Petiole** $\frac{1}{3}$ the sterile leaf length, with sparse brown scales, these widely spreading, 1 mm long, entire. **Lamina** linear-elliptic, chartaceous to subcoriaceous, apex acute to acuminate, base cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** as on petiole: sparse, small, brown, entire, ovate, on abaxial costa and margin, often glandular-punctate below. **Fertile leaf** longer than the sterile, petiole $\frac{1}{8}$ the leaf length, the lamina linear, 6–8 mm wide; intersporangial scales lacking.

Epiphytic and terrestrial in wet forests, 400–2650 m, Huánuco, Junín, Pasco, Ucayali, Cuzco.

Huánuco: Carpish Divide, C. Landeman 5157 (K). León Prado, La Divisoria, Plantación Azul, Ridout, 3 Aug. 1942 (USM). Cushi, Macbride 4812 (F, US). Muña, Bryan 532 (F, US). **Pasco:** Prov. Oxapampa, Abra los Mellizos, Skog et al. 5042 (US). **Junín:** Tarma, Chanchamayo, Esposto 686 (GH). Pichis Trail, Eneñas, Killip & Smith 25668 (NY, US). Chanchamayo Valley, C. Schunke 136 (F, US). Schunke Hacienda, above San Ramón, C. Schunke A 145 (US). Tarma, Agua Dulce, Woytkowski 35494 (UC). Utcuyacu, Woytkowski 494 (US). **Ucayali** (as Loreto): Coronel Portillo, cerca a la Divisoria, Ridout (USM: 12470), 3 Aug. 1942 (GH). **Cuzco:** Paucartambo, Sta. Isabel, Kosñipata, C. Vargas 23014 (GH).

18. ***Elaphoglossum concinnum* Mickel, sp. nov.**

Ab *E. squamipedi* frondibus minoribus, lamina squamis obscurioribus vestitis distat.

Stem long-creeping, 0.5–0.8 mm in diameter, scales linear-lanceolate, orange-tan, ca. 3 mm long, entire. **Phylloodia** lacking. Leaves 1–5 mm apart, 1.3–2.6 (3.5) cm long, 0.5–0.9 cm broad. **Petiole** $\frac{2}{5}$ – $\frac{3}{5}$ the sterile leaf length, with tan scales widely spreading, 1–2 mm long, entire. **Lamina** ovate and suborbicular to oblanceolate, subcoriaceous, apex obtuse, base narrowly to broadly cuneate. **Veins** obscure, free, 1 mm apart, at 60–70 degree angle. **Hydathodes** lacking. **Lamina scales** dark brown to black, sclerotic, scattered, especially abaxially, linear-deltate, subentire, with sparse irregular teeth, adaxial ones fewer, paler. **Fertile leaves** longer than the sterile, petiole $\frac{1}{5}$ the leaf length, lamina ovate-deltate to suborbicular; intersporangial scales black, sclerotic.

TYPE—Peru, San Martín, Mariscal Cáceres, Río Abiseo Nat. Park, near Las Papayas ruins, Young 1301 (holotype, NY!).

Endemic. Epiphytic in wet forests, 2600–3750 m, Amazonas, San Martín.

Amazonas: Prov. Bongará, 2–4 km WSW of Poma-cocha, Wurdack 874 (US). **San Martín:** Mariscal Cáceres, trail between La Playa camp & Papayas camp, Río Abiseo Nat. Park, Young & León 4960 (USM).

19. ***Elaphoglossum craspedotum* Copel., Univ. Calif. Publ. Bot. 19: 303. t. 63. 1941. TYPE: Peru, Huánuco, Dist. Churubamba, Hacienda Mercedes, Mexia 8177 (holotype, UC!; isotypes, F!, GH!, US!).**

Stem compact, horizontal, ca. 8 mm in diameter, scales linear-lanceolate, lustrous, dark red-brown, 4–6 mm long, entire. **Phylloodia** evident, ca. 4 cm long. Leaves fasciculate, 60–75 cm long, 3.4–4.6 cm broad. **Petiole** $\frac{1}{5}$ the sterile leaf length, with tan to orange scales appressed to spreading, 1–2 mm long, with very thin, sparse hair-teeth. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base attenuate. **Veins** evident, free, ca. 1 mm apart, at 70–80 degree angle. **Hydathodes** lacking. **Lamina scales** adaxially white, substellate, scattered, ca. 0.2–0.5 mm long, abaxial laminar surface punctate, glandular, costal scales pale, nearly round, ciliate, 0.5 mm long. **Fertile leaf**

shorter than the sterile, petiole $\frac{3}{5}$ the fertile leaf length, the lamina linear, 10–13 mm broad; intersporangial scales lacking.

Endemic. Epiphytic in wet forest, 1200 m, Huánuco.

Thus far known only from the type.

20. **Elaphoglossum cuspidatum** (Willd.) Moore, Index fil. xvi. 1857.

Acrostichum cuspidatum Willd., Sp. pl. ed. 4, 5: 106. 1810. TYPE: Venezuela, Caracas, *Bredemeyer* (holotype, b!, *Herb. Willd.* 19516).

Stem short-creeping, ca. 4–8 mm in diameter, scales linear-lanceolate, lustrous, black-brown, 2–3 mm long, entire. **Phylloodia** distinct. **Leaves** 1–10 mm apart, 28–75 cm long, 1.9–4.6 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with ovate to lanceolate scales, these black with white, ciliate margin, appressed, 1–3 mm long. **Lamina** narrowly elliptic, chartaceous, apex cuspidate (to acuminate), base broadly to narrowly cuneate. **Veins** obscure, free, 1 mm apart, at ca. 80 degree angle. **Hydathodes** lacking. **Lamina scales** orange, abaxially consisting of a felt-like mass of round, peltate ciliate scales 0.5 mm long and ovate-lanceolate scales 1 mm long, the larger ones with maroon center, costal scales ovate to ovate-lanceolate, red-black with pale ciliate margin as on petiole, lamina adaxially glabrous or with scales scattered to dense, round, peltate, ciliate, pale, ca. 0.7 mm in diameter. **Fertile leaves** shorter than the sterile, petiole $\frac{2}{3}$ the fertile leaf length, the lamina slightly narrower than the sterile; intersporangial scales lacking.

Epiphytic, rarely terrestrial in wet forests, (600) 1200–3800 m, Piura to Amazonas, south to Cuzco.

Costa Rica; Venezuela to Bolivia.

Piura: Huancabamba, Loma redonda (Sapalache-Chinjuela), *Sagástegui* 10193 (NY, HUT, UC), Ayabaca, *Soukup* 4315 (us). **Cajamarca:** Chota, La Palma-Dist. Conchán, *A. Diaz & Laos* 5730 (USM). Chota, Chota-Tacabamba road, *D. Smith & Vásquez M.* 3556 (UC). **Amazonas:** Bongará, 3 km S Pomacocha, *Wurdack* 1002 (F, GH, NY). NW of Jumbilla, *Soukup* 5245 (GH). **La Libertad:** Otuzco, Huaranchal, *Sagástegui* 0203 (GH). **San Martín:** Lamas, Alonso de Alverado, San Juan de Pacayzapa, *J. Schunke V.* 5891 (F). Palo Blanco, *J. Schunke V.* 5673 (F). Zepelacio, near Moyobamba, *Klug*

3503a (us). **Ancash:** Yungay, Quebrada Llanganuco, *Perez* 99 (USM). **Pasco:** Oxapampa, *Soukup* 3355 (F, GH, us). Oxapampa, near Villa Rica, Chacra del Sr. Simon Espípilo, *van der Werff et al.* 8317 (MO). **Junín:** Chanchamayo Valley, *C. Schunke* 173 (F). Tarma, Cumbre Yacunay ridge above La Merced, *Hutchinson* 1978 (F, GH, UC, us). Tarma, Agua Dulce, *Woytkowski* 35498 (UC). **Ucayali** (as Loreto): Coronel Portillo, La Divisoria, *Ferreira* 1049 (GH). **Cuzco:** Prov. La Convención, Quellouno-Chirumbia, *C. Vargas* 11377 (GH). La Convención, NE from Hacienda Luisiana & Apurímac River (Cordillera Vilcabamba), *Dudley* 11147 (GH). Urubamba, Machu Picchu, *Saunders* 462A (F). Los Palmitos, Cabecero Río Kariben, *Bües* 1959 (us).

21. **Elaphoglossum decoratum** (Kunze) Moore, Index. fil. 8. 1857.

Acrostichum decoratum Kunze, Linnaea 9: 25. 1835. TYPE: Peru, Huánuco, Pampayaco (Pampayacu), *Poeppig* Diar. 1134, July 1829 (holotype, LZ, destroyed; isotype, MO!).

Stem short-creeping, to 6 mm in diameter, scales linear, orange, crispate, to 16 mm long, entire or with very sparse, small, irregular teeth. **Phylloodia** lacking. **Leaves** fasciculate, to 70 cm long, 12 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, scales orange, ovate, spreading, with obtuse tip, to 10 mm long. **Lamina** elliptic, apex cuspidate, base broadly cuneate; texture thin. **Veins** evident, free (with rare anastomoses), ca. 2 mm apart, at ca. 70 degree angle. **Hydathodes** lacking. **Lamina scales** limited to the costa and margin, forming a continuous band of overlapping, cordate, golden scales on the margin, elliptic on the costa. **Fertile leaves** rare, shorter than the sterile ones, margins lacking scales; intersporangial scales lacking.

Epiphytic in wet forests, 800–1500 m, Huánuco, Cuzco.

Guatemala; Costa Rica; Panama; West Indies; Colombia and Venezuela to Bolivia.

Huánuco: Río Llullapichis watershed, Cerros del Sira, *Dudley* 13008 (GH). Sira mountains, *Seidenschwarz* 442/1 (us, GH). **Cuzco:** Paucartambo, Cosñipata Valley, Río Tono, *Wachter* 132 (F).

22. **Elaphoglossum dichroum** Mickel, sp. nov.

Stipitis costaeque squamis dentatis bicoloribus, squamisque dentatis laminae marginem versus congestis praestans.

Stem compact, 5 mm in diameter, scales linear, dull, tan with blackish streaks, ca. 10 mm long, entire. **Phylloodia** present. Leaves approximate, 65–70 cm long, 5.5–6.0 cm broad. Petiole $\frac{1}{3}$ – $\frac{2}{3}$ the sterile leaf length, scales black-centered with white margin, larger ones ovate-lanceolate, 2–6 mm long, slightly spreading, smaller ones 1 mm long, appressed. **Lamina** narrowly elliptic, subcoriaceous, apex acute, base truncate. Veins evident, 1 mm apart, at 75 degree angle. **Hydathodes** lacking. **Lamina surface** adaxially glabrescent, with concentration of 1 mm hair-toothed scales at margin, abaxially glabrous, indistinctly gland-dotted, or with scattered stellate trichomes, the scales reduced to 1–3 rays, costal scales 1–2 mm long, erose-denticulate, black-centered with white margin. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{5}$ the leaf length, lamina linear, 1 cm broad; intersporangial scales abundant, ciliate.

TYPE—Peru, San Martín, Mariscal Cáceres, Parque Nac. Río Abiseo, Puerta del Monte, *León & Young 1510* (holotype, USM!).

Endemic. Epiphytic in wet forests, elevation unknown, San Martín.

This species is closely allied to *E. oculatum*, as evidenced by the marginal concentration of scales, ciliate intersporangial scales, bicolorous petiole and costal scales, the nearly naked lamina surfaces with scales reduced to stellate trichomes, but it is much larger, the apex is acute rather than obtuse, and the fertile lamina is linear and shorter than the sterile.

Thus far known only from the type.

23. ***Elaphoglossum discolor* (Kuhn) C. Chr.**, Index fil. 306. 1905.

Acrostichum discolor Kuhn, Linnaea 36: 53. 1869. SYNTYPES: Brazil, San Gabriel ad Rio Negro, Spruce 2309, 2245; Brazil, Panure, Spruce 2869 (none located, all B?).

Stem compact, horizontal, ca. 3–4 mm in diameter, scales linear-lanceolate, reddish-orange, ca. 3 mm long, with irregular weak teeth. **Phylloodia** evident. Leaves fasciculate, ca. 30 cm long, 4.0–4.5 cm broad. Petiole $\frac{1}{2}$ the leaf length, with orange to blackish, lanceolate to linear scales to trichomidia, scales ascending, 2–3 mm long, with irregular teeth. **Lamina** elliptic, chartaceous, apex acuminate, base cuneate and abruptly decurrent. Veins evident, free, 1 mm apart, at ca. 80 degree angle. **Hydathodes** lacking. **Lamina scales** linear

with long, sparse teeth on both sides of lamina, 1–1.5 mm long. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{5}$ the fertile leaf length, the lamina narrowly elliptic, 2 cm broad, acute; intersporangial scales lacking.

Epiphytic and terrestrial, low forest on white sand and wet forests, 150–980 m, San Martín, Loreto, Pasco, Junín.

Venezuela; Colombia; Ecuador; Peru; Brazil.

Elaphoglossum discolor can be distinguished by the short stem, its scales linear and reddish-orange with irregular processes, the petiole scales scattered, lamina scales scattered, linear, flexuous, dissected, and the fertile leaf longer than the sterile.

San Martín: Rioja, near Rioja and Naranjos, *Knapp et al. 7444* (uc). **Loreto**: Maynas, Iquitos, Carretera de Varillal km 6 de Quisto Cocha al caserío de Varillal, *Rimachi Y. 7844* (ny). Prov. Maynas, Distr. Iquitos, Puerto Almendras, *van der Werff et al. 9788, 9819, 9820* (uc). Prov. Requena, Jenaro Herrera, *van der Werff et al. 10001* (uc). Vicinity of Iquitos, *Revilla 3758* (ny), 4322 (uc). **Pasco**: Oxapampa, Palcazú valley, *D. Smith 3852* (uc). **Junin**: East of Quimiri Bridge near La Merced, *Killip & Smith 23850* (us).

24. ***Elaphoglossum diversifrons* C. Chr.**, Index fil. Suppl. 1: 42. 1913.

Acrostichum diversifolium Sodiro, Sert. fl. ecuad. II. 32. 1908, not Blume, 1828. SYNTYPES: Ecuador, in silvis suband. vulc. Corazón *Sodiro*; Atacatzo, *Sodiro* (p!, s!); “itemque in loc. praeeruptis opacis prope Quito,” *Sodiro* (p!).

Stem short-creeping, 1.5–2 mm in diameter, scales linear, lustrous, castaneous, 3–4 mm long, denticulate. **Phylloodia** lacking. Leaves approximate, 15–24 cm long, 2.0–2.4 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, scales castaneous, lustrous, subulate, patent, denticulate, 1–2 mm long. **Lamina** elliptic, chartaceous, apex acuminate, base broadly cuneate to rounded. Veins evident, 2–2.5 mm apart, at ca. 60-degree angle. **Hydathodes** present. **Lamina scales** evenly scattered on both surfaces, subulate, castaneous, 1–2 mm long. **Fertile leaves** slightly longer than the sterile, petiole about $\frac{3}{4}$ the leaf length, lamina lanceolate; intersporangial scales lacking.

Epiphytic in wet forests, 2700 m, Huancavelica. Ecuador; Peru.

Huancavelica: Tayacaja, Marcavalle, *Tovar 4756* (GH).

25. *Elaphoglossum elegantipes* Mickel, sp. nov.

Rhizomatis squamae fuscae cum stipite gracile notulas diagnosticas proferunt.

Stem compact, horizontal, 3–4 mm in diameter, scales linear-lanceolate, dull dark brown, 3–5 mm long, with hairlike processes. *Phylloodia* present. Leaves fasciculate, 24–42 cm long, 2.7–4.8 cm broad. Petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, glabrous. Lamina elliptic, chartaceous, apex long-acuminate, base attenuate. Veins evident, free, 1 mm apart, at 70–80 degree angle. *Hydathodes* lacking. Lamina indument lacking abaxially, but occasionally some minute, orange, stellate trichomidia adaxially. Fertile leaves longer or slightly shorter than the sterile, petiole $\frac{3}{4}$ – $\frac{2}{3}$ the fertile leaf length, lamina slender, 1.4–2.0 cm broad; intersporangial scales lacking.

TYPE—Peru, Cuzco, Paucartambo, Cosñipata Valley, Río Tono, N. of Patria, *Wachter* 138 (holotype, Fl; isotype, GH!).

Endemic. Epiphytic, rarely terrestrial, in wet forests, 300–2400 m, Amazonas, Huánuco, Pasco, Junín, Ucayali, Cuzco, Madre de Dios, Puno.

Amazonas: Bagua, ca. 20 km E of La Peca, *Barbour* 2766 (uc). **Huánuco:** SW slope of Río Llullapichis watershed on ascent of Cerros del Sira, *Dudley* 13134 (GH). **Carpish, Ellenberg** 3931 (GH). **Pasco:** Oxapampa, Palcazú valley, between Iscozacín & Villa America, *D. Smith* 3852 (MO). Oxapampa, Gran Pajonal, 2–3 km N of Chiquitavo, *D. Smith* 5087 (MO, UC). Oxapampa, 4–5 km N of Mallampampa, *D. Smith & Canne* 5795 (MO). 2–4 km N of Mallampampa, *D. Smith & Canne* 5862 (MO). Oxapampa, Palcazú, Río Alto Iscozacín, Ozuz, *Foster* 9950 (F). Chontabamba, Abra “La Suiza”, camino al Río Chontabamba, *León* et al. 979 (F). **Junin:** La Merced-Chanchamayo, *Soukup* 1104 (F). Satipo, Pichanaki, *León* 229 (USM). Chanchamayo Valley, *C. Schunke* 174 (F). **Ucayali** (as Loreto): Coronel Portillo, Chacra de Cesar Vela, *J. Schunke* V. 5493 (F). **Cuzco:** Paucartambo, Cosñipata Valley, Río Tono, N of Patria, *Wachter* 169 (F, GH). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *Foster* 10752 (F). **Puno:** La Pampa, Río Tavara, *Watkins* in 1916 (US).

26. *Elaphoglossum engelii* (Karsten) Christ, Monogr. *Elaphoglossum* 81. 1899. *Acrostichum engelii* Karsten, Fl. Columb. 1: 118, t. 59. 1860. TYPE: Colombia, cordillera Meridensis, Karsten (holotype, B?).

Stem compact, horizontal, 5–8 mm in diameter, scales linear, lustrous, maroon, 8–15 mm long, entire to irregularly hair-toothed. *Phylloodia* present but hidden by scales. Leaves fasciculate, 17–47 cm long, 1.4–2.7 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$

the sterile leaf length, scales orange, appressed, 3–7 mm long, ciliate. Lamina narrowly elliptic, coriaceous, apex obtuse, base broadly cuneate to rounded. Veins obscure, free, 1 mm apart, at ca. 70 degree angle. *Hydathodes* lacking. Lamina scales abaxially lanceolate, orange, ciliate, 2–3 mm long, dense to loose, costal scales broader, ovate-lanceolate, orange to dark centered, 3–4 mm long, adaxially same as below. Fertile leaves longer than the sterile, petiole $\frac{2}{3}$ the fertile leaf length, lamina narrower than the sterile; intersporangial scales lacking (costal scales ovate-lanceolate, ciliate, darker center plus small round ciliate ones).

Terrestrial, epipetric, and epiphytic, in eraceous heath, shrubby grassland, puna, rocky road-banks, talus slopes, elfin forest, and cloud forests, (1800–)2800–4600 m, Piura to Amazonas, southward to Ayacucho and Puno.

Elaphoglossum engelii is in the *E. muscosum* group, differing from others in that complex by the petiole scales being long-ciliate rather than erose-denticulate. A name sometimes used for this species is *E. denticulatum* Ruiz & Pavón. I have not found the reference or description (the epithet would be under *Acrostichum*), but if it does apply, it would have priority.

Piura: Huancabamba, above Canchaque on road to Huancabamba, *Hutchinson* 1651 (UC). **Lambayeque:** Ferreñafe, ca. 7 km NW of Incahuasi, *Dillon & Skillman* 4116 (F, GH). Ferreñafe, Incahuasi, Laguna Temlaminara, *Sagástegui* 12780 (UC). **Cajamarca:** Cajabamba, Cajabamba-Luchubamba, *Sagástegui* 11200 (GH, NY). **Amazonas:** Chachapoyas, Cerros Calla Calla, above Leimebamba on road to Balsas, *Hutchinson & Wright* 5567 (F, GH, NY, UC, US). Entre donila y Cohechan, *Soukup* 4133 (F). **La Libertad:** Sanchez, Carrion, road from Trujillo to Huamachuco, *Dimmitt* 1135 (NY). **San Martín:** Mariscal Cáceres, Río Abiseo Nat. Park, *Young & Watson* 3508 (NY). **Ancash:** Huari, Huascará Nat. Park, *D. Smith* et al. 12382 (F, NY). Yungay, Quebrada de Llanguanuco, *Perez* 85 (USM). **Huánuco:** Mito, *Bryan* 370 (F). **Huánuco:** Carpish, *Coronado* 74 (GH, UC). **Junin:** Chanchamayo, Mina Pichita, above San Ramón, *van der Werff* et al. 8658 (MO, UC). **Ayacucho:** Pampalca between Huanta & Río Apurímac, *Killip & Smith* 23283 (NY, US). **Apurímac:** 5 km N of Huancarama, *West* 3801 (UC). **Cuzco:** Urubamba, Machu Picchu, in Llactapampa on Aobamba River, *Peyton & Peyton* 815 (GH, MO). Pillahuata, Cerro de Cusilluyoc, *Pennell* 14125 (GH, NY, US). **Puno:** Sandia, S of Limbani, *Metcalf* 30453 (GH), also *Ruiz* 4570 (53 crossed out) (US ex Herb. Lambertii).

27. *Elaphoglossum ensiforme* Mickel, sp. nov.

Ab *E. lloensi* squamis stipitis laminaeque pallidis et lamina graciliori apicem versus gradatim attenuata distat.

Stem long-creeping, 1–1.5 mm in diameter, scales linear-lanceolate, dull tan, 3–5 mm long, entire. **Phylloodia** lacking. **Leaves** fasciculate, (9–)21–26 cm long, 1.4–2.0 cm broad. **Petiole** $\frac{2}{5}$ – $\frac{3}{5}$ the sterile leaf length, with orange scales appressed to ascending, 3–4 mm long, subentire with occasional irregular teeth. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base narrowly cuneate. **Veins** evident, free, 1–1.3 mm apart, at ca. 60 degree angle. **Hydathodes** lacking. **Lamina scales** scattered, linear-deltate, tan, 1–2 mm long, hastate abaxially, sparse adaxially. **Fertile leaves** not known.

TYPE—Peru, Cuzco, Urubamba, Machu Picchu, in Llactapampa, a small pampa below Palcay on the Aobamba River, *Peyton & Peyton 814* (holotype, MO!).

Endemic. Epiphytic in wet forests, 3300 m, Cuzco.

Elaphoglossum lloense (Hooker) Moore (Venezuela, Colombia, Ecuador) has lamina proportionally broader, with more caudate apex, lamina scales darker, and petiole scales with black base.

Cuzco: Urubamba, Machu Picchu, in Llactapampa, a small pampa below Palcay on the Aobamba River, *Peyton & Peyton 811* (MO).

28. *Elaphoglossum erinaceum* (Fée) Moore. Index fil. 9. 1857. Figure 25c.

Acrostichum erinaceum Fée, Mém. foug. 2: 41. 1845.
SYNTYPES: Guadeloupe, riviere de Saint-Louis, de Thiouville (P!); Brazil, Gaudichaud; Mexico, Karwinsky, in 1827.

Elaphoglossum erinaceum var. *boliviensis* Rosenst., Repert. Spec. Nov. Regni Veg. 12: 476. 1913.
TYPE: Bolivia, Polo-Polo bei Coroico, Nordyun-gas, Buchtien 3470 (isotype, US!).

Stem short creeping, 10–20 mm in diameter, scales linear, castaneous to orange, to 17 mm long, plane to crispate, entire or with very irregular teeth near the tip. **Phylloodia** lacking. **Leaves** fasciculate, 30–52 cm long, 3.7–9.2 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, scales dark reddish brown, subulate, widely spreading, to 5 mm long, also with minute erect glandular trichomes on petiole and midvein. **Lamina** lanceolate to elliptic, apex acuminate to caudate, base rounded (rarely cuneate). **Veins** evident, free, 1–1.5 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** subulate, dark reddish brown, often ap-

pearing black, mostly on the midvein and spreading from the margin, also with minute, simple, branched, or stellate trichomidia on the abaxial surface. **Fertile leaves** slightly shorter than the sterile, petiole $\frac{1}{3}$ – $\frac{1}{2}$ the fertile leaf length, lamina narrowly elliptic, with scattered dark subulate scales on the abaxial costa, intersporangial scales lacking.

Epiphytic, rarely terrestrial, in wet forests, 700–3325 m, Cajamarca, Amazonas, San Martín, Huánuco, Madre de Dios.

Mexico to Panama; West Indies; Venezuela and Colombia to Bolivia and Brazil.

Elaphoglossum erinaceum belongs to a very perplexing group. The Peruvian collections are somewhat larger and have more rounded lamina bases than the Mexican and West Indian material, generally stout petioles (stouter than in Central America), 2.5 mm thick, and broad laminae and longer fertile leaves.

Cajamarca: Colasay, Woytkowski 7019 (US). **Amazonas**: Bagua, E of La Peca, Barbour 2528 (MO), 2757 (UC). Serranía de Bagua, 17 km E of La Peca, Gentry et al. 22977 (US). **San Martín**: Mariscal Cáceres, Chochos valley, NW corner Rio Abiseo Nat. Park, Young 2633 (NY). Young & Watson 3468 (NY). **Huánuco**: Huacachi, Estación near Muña, Macbride 4690 (US). **Ucayali** (as Loreto): Coronel Portillo, Tingo María–Pucallpa road, Skog et al. 5154 (US). **Madre de Dios**: Manú, Cerro de Pantacolla, Río Palotoa, R. Foster 10849 (F). **Department unknown**: C. Schunke, Aug 1908 (UC).

29. *Elaphoglossum erythrolepis* (Fée) Moore, Index fil. 9. 1857.

Acrostichum erythrolepis Fée, Mém. foug. 2: 60. 1845.
TYPE: Peru, Dombey (holotype, P!).

Stem compact, horizontal, ca. 10 mm in diameter, scales linear, often forked into hairlike branches, lustrous, maroon, ca. 20 mm long, with scattered stiff hair-teeth. **Phylloodia** distinct. **Leaves** fasciculate, 25–36 cm long, 1.4–2.2 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{2}{5}$ the leaf length, with light to dark reddish brown dense scales, these ascending, lanceolate, 3–5 mm long, ciliate. **Lamina** narrowly elliptic, coriaceous, apex acuminate, base cuneate. **Veins** not evident, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially dense, lanceolate, 1.5–2 mm long, ciliate, reddish, costal scales 3–4 mm long, more ascending, adaxially pale, ovate to lanceolate, longer and more ascending on costa, to glabrescent. **Fertile**

leaves longer than the sterile, petiole $\frac{1}{2}$ the leaf length, lamina as large as the sterile; intersporangial scales lacking.

Terrestrial and epipetric, 2900 m, Huánuco, Junín, Apurímac.

Ecuador; Peru.

Huánuco: Mito, *Macbride & Featherstone* 1392 (f, in part). Pachitea, *Huapalla* 2027 (usm). Along highway between Huánuco y Tingo María, at Río Tulca, *Croat* 57899 (f). Chincha, entre Huánuco y Tingo María, *Ferreira* 16981 (gh). **Junín:** Manto to Yaupi, *Woytkowski* 6551 (gh). Tarma, Carpapata, *Cerrate* 2775 (gh). Huacapistana, *Sandeman* 4549 (k), *Killip & Smith* 24501, 24175 (ny). **Apurímac:** Abancay, 11–12 km E of Abancay, *Hutchinson* 1734 (uc).

30. *Elaphoglossum eximium* (Mett.) Christ, Monogr. Elaphoglossum. 107. 1899.

Acrostichum eximium Mett., Ann. Sci. Nat. Bot. 5, 2: 199. 1864. TYPE: Venezuela, Colonia Tovar, Moritz 419 (isotype, us!).

Stem short-creeping, ca. 3–4 mm in diameter, scales brown to castaneous, lustrous, linear, entire, 2–4 mm long. **Phylloodia** lacking. **Leaves** fasciculate, to 44 cm long, 1.3 cm broad. **Petiole** short, $\frac{1}{10}$ – $\frac{1}{16}$ the sterile leaf length, densely clothed with short, brown, subulate scales. **Lamina** linear, texture thin, apex acuminate, base attenuate, margin slightly crenulate. **Hydathodes** evident. **Lamina scales** conspicuous but sparse on costa, smaller on margin, mostly between crenulations, minute punctae inconspicuous on lamina surfaces. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{4}$ the fertile leaf length, lamina smooth-margined, lanceolate to narrowly elliptic, apex apiculate, base cuneate to rounded; intersporangial scales lacking.

Epiphytic or terrestrial in wet forests, 1800–2320 m, San Martín, Huánuco, Cuzco.

Mexico to Panama; Colombia; Venezuela; Ecuador; Peru.

Peruvian material differs from plants of Venezuela and Central America in having the fertile lamina base cuneate or rounded rather than truncate to subcordate and may represent a distinct taxon.

San Martín: Rioja, Venceremos, D. Smith 4434 (uc). **Huánuco:** Huacachi, near Muña, *Macbride* 4131 (f, us). **Cuzco:** La Convención, Huayopata, *Peyton & Peyton* 885 (gh).

31. *Elaphoglossum flaccidum* (Fée) Moore, Index fil. 356. 1862.

Acrostichum flaccidum Fée, Mém. soug. 2: 35. t. 7, f. 2. 1845. SYNTYPES: Guyana, Oyapoc, *Leprieur*, in 1834 (pl), *Schomburgk* 448 (pl); S. Yago de Cuba, *Linden* 2058 (pl); Guadalupe, Lezaredo, *l'Herminier* (pl); Martinique, *Heraud*.

Stem compact, horizontal, ca. 3–4 mm in diameter, scales linear-lanceolate, lustrous, blackish brown, 3–4 mm long, entire, somewhat deciduous. **Phylloodia** evident. **Leaves** fasciculate, 23–37 cm long, 2.3–3.6 cm broad. **Petiole** ca. $\frac{1}{20}$ the sterile leaf length, with orange-tan scales appressed, 1–2 mm long, with weak hairlike teeth. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base narrowly cuneate. **Veins** evident, free, 1–1.5 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** few, like those of petiole at costa base. **Fertile leaves** shorter than the sterile, petiole ca. $\frac{1}{2}$ the fertile leaf length, the lamina narrowly elliptic; intersporangial scales lacking.

Epiphytic in wet forests, 600–1300 m, Amazonas, San Martín, Huánuco, Pasco, Junín, Madre de Dios.

West Indies; Guianas; Venezuela: Colombia to Bolivia.

Amazonas: Prov. Bagua, Quebrada Tambillo, *Wurdack* 1989 (us). **San Martín:** Mariscal Cáceres, Palo Blanco, al oeste del Puente, Tocache Nuevo, *J. Schunke* V. 5656 (f), *Plowman* 7469 (f). Tingo María, jungle E of Tingo María, *Allard* 20601, 20941 (us), 21388 (gh, us). Mishuyacu near Iquitos, *Klug* 1461 in part (f). **Huánuco:** Leoncio Prado, Rupa Rupa, al este de Tingo María, *J. Schunke* V. 5192 (f, uc). **Pasco:** Oxapampa, Quebrada Castilla on the Omaiz river, *León & Young* 1022 (f). **Junín:** Pichis Trail, San Nicolás Azupizú, *Killip & Smith* 26122 (us). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palotoa 10–15 km NW of Shintuya, *Foster* 10752 (gh), 10826 (f, gh).

32. *Elaphoglossum fortipes* Mickel, sp. nov.

Rhizome elongato repenti phylloodiisque longissimis praestans.

Stem long-creeping, 2–3 mm in diameter, scales linear-lanceolate, lustrous, dark brown, 3–4 mm long, entire. **Phylloodia** evident, 2–3.8 cm long. **Leaves** 1–2 cm apart, 12–15 cm long, 1.1–1.4 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{1}{5}$ the sterile leaf length, with brown scales ascending to widely spreading, 2–2.5

mm long, with minute teeth. **Lamina** very narrowly elliptic, chartaceous, apex acuminate, base cuneate. **Veins** evident, free, 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** on abaxial costa deltate-lanceolate, 1 mm long, adaxially and abaxially scattered, 0.5–1 mm long, orange, deltate to deltate-lanceolate, dentate. **Fertile leaves** unknown.

TYPE—Peru (Cuzco), Puente de Nantto, Valle de Lares, Bües 1875 (us).

Habitat unknown, 2000 m, Cuzco.

Thus far known only from the type.

33. **Elaphoglossum glabellum** John Sm., London J. Bot. 1: 197. 1842. **TYPE**: British Guiana, Schomburgk 447 (holotype, BM!; isotype, US!).

Acrostichum glabellum (John Sm.) Klotzsch, Linnaea 20: 421. 1847.

Stem short to moderately creeping, 2–3 mm in diameter, scales lanceolate, lustrous, dark brown to black, with pale brown base, margin, and tip, 1–2 mm long, entire or with a few weak teeth, scales tending to be somewhat deciduous, often leaving a partially naked stem. **Phylloodia** distinct, 4–8 mm long. **Leaves** spaced slightly apart, to 33 cm long, 0.5–1.0 (1.6) cm broad, the margin usually incurved. **Petiole** $\frac{1}{10}$ – $\frac{1}{5}$ the sterile leaf length, naked or with minute appressed scales. **Lamina** linear-elliptic, gradually acuminate at both ends, coriaceous. **Veins** obscure, free, ca. 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** lacking. **Fertile leaves** slightly shorter than the sterile, the petiole $\frac{1}{3}$ – $\frac{1}{2}$ the fertile leaf length, the lamina ca. 10 mm broad; intersporangial scales lacking.

Epiphytic in wet forests, 130–1800 m, Loreto, Huánuco, Junín, Cuzco, Madre de Dios.

Mexico to Panama: West Indies; Trinidad; Guyana; Surinam; Venezuela; Colombia to Bolivia.

Loreto: Maynas, Distr. Iquitos, Puerto Almendras, *van der Werff* 9800 (uc). Maynas, Varillal, carretera a Nauta, Vásquez 1211 (mo). **Huánuco**: SW slope of Río Llullapichis watershed on ascent of Cerros del Sira, *Dudley* 13131 (gh). **Junín**: East of Quimirí Bridge, near La Merced, *Killip & Smith* 23993 (gh, ny, us). Satipo, Pichanaki, rodal del Proyecto Peruano-Aleman, *León* 239 (usm). Chanchamayo Valley, *C. Schunke* 115, 172 (f). *Schunke* Hacienda, above San Ramón, *C. Schunke* A144, A147 (us). **Cuzco**: La Convención, Cordillera Vilcabamba, near Río Apurímac and Hacienda Luisiana, *Dudley* 10061

(gh). **Madre de Dios**: Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *Foster* 10691 (f).

34. **Elaphoglossum glossophyllum** Hieron., Hedwigia 44: 180. 1905, *nom. nov.* for *E. linguaeforme* Hieron. 1904, not Moore, 1857.

Elaphoglossum linguaeforme Hieron., Bot. Jahrb. Syst. 34: 542. 1904, not Moore. 1857. **SYNTYPES**: Colombia, above Popayán, *Lehmann* 6944 (b!, us!), 6943 (not located); Antioquia, near Sonsón, *Lehmann* 7582 (not located).

Stem long-creeping, ca. 2–3 mm in diameter, scales lanceolate to ovate-lanceolate or deltate, dull orange or with lustrous black streaks, 4–7 mm long, with hairlike processes. **Phylloodia** present. **Leaves** mostly 1–3 cm distant, 16–54 cm long, 2.2–5.0 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, glabrous. **Lamina** lanceolate, coriaceous, apex acute to acuminate, base broadly cuneate to rounded. **Veins** obscure, free, 1 mm apart, at ca. 80-degree angle. **Hydathodes** lacking. **Lamina scales** lacking, or surfaces with stellate trichomidia to glabrous. **Fertile leaf** longer than the sterile, petiole $\frac{1}{2}$ – $\frac{2}{3}$ the leaf length, the lamina acute to obtuse, nearly equal to the sterile in size; intersporangial scales lacking.

Epiphytic in wet forests, 2200–3500 m, Cajamarca, Amazonas, San Martín, Huánuco, Pasco, Ayacucho, Cuzco.

Colombia; Ecuador; Peru.

Cajamarca: San Miguel, Taulis Playa (Calquis), *Mos-tacero et al.* 1192 (f, ny). Chota, Chota-Tacabamba road, 14 km from Chota, *D. Smith & Vásquez* 3554 (f, mo, uc). **Amazonas**: Chachapoyas, Cerros Calla Calla, E side, 19 km above Leimebamba on road to Balsas, *Hutchison & Wright* 5547 (f, gh, ny, uc). Chachapoyas, Cerros Calla Calla, W side, above Balsas on road to Leimebamba, *Hutchison & Wright* 5810 (f, gh, mo, ny, uc, us). **San Martín**: Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, Chochas, *Young & León* 4735 (usm). **Huánuco**: Caní, Pueblo 7 mi NE at Mito, *Macbride* 3403 (f). Carpish Pass, 84 km from Tingo María, *Allard* 20985 (us). **Pasco**: Oxapampa, Cumbre de la cordillera San Gutardo, *León* 521 (usm). **Ayacucho**: LaMar, eastern Massif of Cordillera Central, *Dudley* 12027 (gh, us). **Cuzco**: La Convención, grasslands at camp 6, cordillera Vilcabamba, *Dudley* 11041 (gh). Cabecera del Karibení, Bües 1960 (us).

35. **Elaphoglossum gracillimum** Mickel, *sp. nov.*

Rhizomate pergracili, lamina lineari tenui, frondisque stipe elongata et lamina parva recognita.

Stem long-creeping, 1–1.5 mm in diameter, scales linear, lustrous, castaneous, to 4 mm long, entire to minutely and sparsely serrulate. **Phyllopodia** lacking. **Leaves** ca. 1 cm apart, 8–12 cm long, 0.6–1.3 cm wide. **Petiole** $\frac{1}{8}$ – $\frac{1}{4}$ the sterile leaf length, with scales castaneous, widely spreading, 1–2 mm long, lanceolate, finely serrulate toward apex. **Lamina** linear-lanceolate, chartaceous, apex acuminate, base broadly cuneate to rounded. **Veins** evident, free, 1.5–2 mm apart, at 60–70-degree angle. **Hydathodes** distinct. **Lamina scales** subulate, castaneous, scattered, 1 mm long on both surfaces, also punctate with stellate trichomidia. **Fertile leaves** slightly shorter than the sterile, petiole ca. $\frac{1}{5}$ the fertile leaf length, lamina elliptic, apex rounded, base rounded to broadly cuneate, scales of petiole, adaxial surface and abaxial costa ovate, smaller (0.5 mm long), and darker (maroon) than on sterile.

TYPE—Peru, Pasco, Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff et al.* 8441 (holotype, NY!; isotypes, MO!, UC!).

Endemic. Epipetric on wet rocks in wet forest, 2300–2500 m, Pasco.

Thus far known only from the type collection.

36. *Elaphoglossum guamanianum* (Sodiro) C. Chr., Index fil. suppl. 1: 42. 1913.

Acrostichum guamanianum Sodiro, Sert. fl. ecuad. 2. 35. 1908. **TYPE**: Ecuador, “in pascuis andin. andium orient. in m. Guamani,” Sodiro, Jan. 1900 (holotype, Pl!; isotype, Bl!).

Stem compact, horizontal, 4–5 mm in diameter (ca. 1 cm with scales and phyllopodia), scales linear-deltate, lustrous, dark red-brown, 1.5–2 mm long, with stiff hairlike teeth. **Phyllopodia** present. **Leaves** approximate, 17–35 cm long, 1.0–1.7 cm broad. **Petiole** $\frac{1}{8}$ – $\frac{1}{4}$ the sterile leaf length, scales scattered, much reduced, to 1 mm long, with long hairlike teeth, dark red-brown, lustrous, appressed. **Lamina** linear-elliptic, chartaceous, apex acuminate, base narrowly cuneate. **Veins** obscure, ca. 1 mm apart, at 70-degree angle. **Hydathodes** lacking. **Lamina scales** adaxially lacking, abaxially loosely clothed with scales 0.5–1 mm long, orangish, lanceolate, with long hairlike teeth, costal scales scattered, dark, as on petiole. **Fertile leaves** slightly shorter than the sterile, petiole ca. $\frac{1}{5}$ the leaf length, lamina only slightly narrower than the sterile, apex acute; intersporangial scales lacking.

Epiphytic in wet forests, 1700 m, Amazonas. Ecuador; Peru.

Peruvian specimens match in that costa scales are small and black, the laminar scales are small (0.5–1 mm long), but lamina is wider in Ecuadorian material (3.5–4.1 cm vs. 1.4–1.7 cm). *Elaphoglossum guamanianum* is similar to *E. paleaceum* in the black, stiffly dentate stem scales and long-ciliate laminar scales, but it differs in the costal scales being black, the laminar scales small, and the scales are much smaller overall.

Amazonas: Prov. Bagua, 12 km E of La Peca, *Barbour* 2564 (F, MO, NY, UC).

37. *Elaphoglossum hartwegii* (Fée) Moore, Index fil. xvi. 1857.

Acrostichum hartwegii Fée, Mém. foug. 2: 53, t. 9, f. 2. 1845. **TYPE**: “Quito, Popayán, Bogotá,” Hartweg 1486 (fl, Herb. Webb, & G, Herb. Delessert).

Stem long-creeping, 1–1.5 mm in diameter, scales linear-lanceolate, castaneous, lustrous with markedly paler margins, with sagittate base, entire, ca. 3 mm long. **Phyllopodia** distinct. **Leaves** often 1 cm apart, to 22 cm long, 1.2 cm broad. **Petiole** $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, scales mostly 1–2 mm long, brown with pale margin, appressed to slightly spreading, entire to slightly dentate. **Lamina** linear-lanceolate, apex acuminate to acute or obtuse, base cuneate. **Veins** inconspicuous, free, 0.8–1 mm apart, at 60–70-degree angle. **Hydathodes** present but inconspicuous, usually hidden under scales. **Lamina scales** of adaxial surface generally abundant but not overlapping, lanceolate to deltate, peltate, brown with pale margins, adaxial surface often essentially glabrous. **Fertile leaves** slightly taller than the sterile, petiole $\frac{2}{3}$ – $\frac{3}{4}$ the fertile leaf length, lamina similar in size and shape to the sterile; intersporangial scales lacking.

Terrestrial and epipetric in paramos, 4000–4700 m, Junín, Madre de Dios.

Mexico; Guatemala; Costa Rica; Colombia to Bolivia.

This is often mistaken for *E. mathewsi*, from which it can be distinguished by the broader, erose lamina scales without ciliate base. The two occasionally grow together but are distinct. It is even more closely allied to *E. rosenstockii*, which has similar scales, but has a wider creeping stem and scales on the abaxial lamina surface.

Junín: Mount La Juntay, near Huancayo, *Killip & Smith* 22053 (GH [mixed with *mathewsi*], NY). Huaytapallana, *Tiller* 122 (USM). **Madre de Dios:** Piñasniocj, Pantiacolla Pass, *Cook & Gilbert* 1792 (US).

38. ***Elaphoglossum hayesii* (Kuhn) Maxon**, Proc. Biol. Soc. Wash. 46: 105. 1933.

Acrostichum hayesii Kuhn, Linnaea 36: 43. 1869.
TYPE: Panama, *Sutton-Hayes* 30, (holotype b!).

Similar to *E. piloselloides* except: lamina thin, oblong, rounded at base, with **hydathodes** apparent; **fertile lamina** orbicular.

Terrestrial or epipetric on dripping cliffs, 400–1500 m, San Martín, Junín.

Panama; Venezuela; Colombia; Peru.

San Martín: Boquerón Pass, 92 km from Tingo María on highway to Pucallpa, *Allard* 2221, in part (US). **Junín:** Chanchamayo Valley, *C. Schunke* 318 (F).

39. ***Elaphoglossum haynaldii* (Sodiro) Losch, Mitt. Bot. Staatssamml. München 1: 21. 1950.**

Acrostichum haynaldii Sodiro, Recens. crypt. vasc. Quit. 80. 1883. TYPE: Ecuador, Los Colorados, Sodiro (not located).

Stem short-creeping, ca. 5 mm in diameter, scales lanceolate, dark orange to maroon, ca. 5 mm long, entire or with irregular teeth. **Phyllopodia** lacking. Leaves fasciculate, to 40 cm long, 1.3–2.4 cm broad. Petiole ca. $\frac{1}{4}$ the sterile leaf length, with scales many, spreading, reddish, subulate, 4–6 mm long; petiole also with minute erect glandular trichomes ca. 0.2 mm long. **Lamina** linear-elliptic, chartaceous, apex acuminate to acute-cuspidate, base cuneate. **Veins** obscure, free, 1.5–2 mm apart, at ca. 60-degree angle. **Hydathodes** evident. **Lamina scales** subulate, reddish, conspicuous, 4–6 mm long, uniformly and liberally distributed over the surfaces, margin and costa, lamina also with minute, erect, glandular trichomes. **Fertile leaves** unknown, but expected to be much shorter than the sterile, lamina orbicular to oblong; intersporangial scales lacking.

Epipetric in wet forests, 1500–2450 m, Ayacucho, Cuzco.

Ecuador; Peru.

This differs from *E. siliquoides* (Jenm.) C. Chr. (of Jamaica) in being epipetric, and having resinous petiole and stem, shorter lamina scales, conspicuous hydathodes, and slender stem.

Ayacucho: Ccarrapa, between Huanta & Río Apurímac, *Killip & Smith* 22392 (F, NY, US). **Cuzco:** Paucartambo, Manú Nat. Park, *Skog & Skog* 5205 (US). Paucartambo, Pillawata, Paso del Aguila, *Vargas* 22993 (GH).

40. ***Elaphoglossum hickenii* (Sodiro) C. Chr., Index fil. suppl. 1: 42. 1913.**

Acrostichum hickenii Sodiro, Sert. fl. ecuad. 1: 35. 1908. TYPE: Ecuador, in silv. suband. vulc. Tungurahua, *Sodiro*, Dec. 1904 (isotypes, s!, us!).

Stem compact, 4–6 mm in diameter, scales linear-lanceolate, lustrous, castaneous to black-maroon, 3–4 mm long, entire. **Phyllopodia** present, obscured by scales. Leaves approximate, 48–64 cm long, 2.5–4.1 cm broad. Petiole $\frac{1}{2}$ the leaf length, scales moderately dense, appressed to ascending, lanceolate to linear-lanceolate, orange-tan, some with dark red tip or center, erose to very short-ciliate. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base broadly cuneate. **Veins** ca. 1 mm apart, at 70-degree angle, hidden by scales. **Hydathodes** lacking. **Lamina scales** adaxially sparse to lacking, ovate-lanceolate to lanceolate, orange-tan, short-ciliate; abaxially ovate-lanceolate to lanceolate, orange, ciliate, 1–2 mm long; costal scales orange, some with maroon center, 1–2 mm long, the larger ones erose to short-ciliate. **Fertile leaves** nearly equaling the sterile in length, petiole $\frac{2}{3}$ the leaf length, lamina slightly narrower than the sterile, apex obtuse, base subtruncate; costal scales linear-lanceolate, ciliate, red-centered, intersporangial scales lacking.

Terrestrial on steep, rocky slopes, ca. 1800–3000 m, Apurímac, Huánuco, Cuzco.

Ecuador; Peru.

Elaphoglossum hickenii is similar to *E. cuspidatum* except: abaxial lamina scales ovate to lanceolate, loosely arranged, not appressed, the costal scales lanceolate, dark red-centered. It closely resembles *E. orbignyanum* but differs in the abaxial lamina scales being loosely arranged and the stem scales nonciliate. In general appearance it may also be taken for *E. laminarioides*, but the petiole and lamina scales are lanceolate rather than round.

The epithet was originally published as “hike-

nii" and so combined by Christensen, but Mille (Nov. Recens. 28. 1928) added the "c". The spelling is mixed on type specimens; e.g., an isotype (s) is labelled "hikenii" but with a "c" inserted in the same hand. There is no reference to the name in the protologue, but it is likely named for the Argentine botanist Cristóbal M. Hicken.

Apurímac: Abancay, Bosque Ampay, Hocking 36 (USM).
Huánuco: Mito, Macbride & Featherstone 1392 (us). Near Huánuco, Calderon, 8 June 1967 (USM).
Cuzco: Paucartambo, Chacapampa, Vargas 9880 (uc). Machu Picchu, Ferreyra 27070 (GH), Saunders 4624 (k), Tryon & Tryon 5397 (GH), D'Arcy 13771 (MO).

41. **Elaphoglossum hieracioides** Mickel, Brittonia 39: 320. 1987. TYPE: Venezuela, Aragua, Tovar, Fendler 268 (holotype, us!; isotypes, GH!, MO!).

Similar to *E. piloselloides* except: fertile lamina narrowly oblanceolate, much longer than broad, often inrolled, base cuneate.

Terrestrial on clay banks and in open woods, 750–2300 m, Amazonas, San Martín, Huánuco, Pasco, Junín, Ayacucho.

Venezuela; Colombia; Peru.

Amazonas: Chachapoyas, slopes of Cano Santa Lucia E of Chachapoyas, Wurdack 743 (F, GH, NY, us).
San Martín: Boquerón Pass, 92 km from Tingo María on highway to Pucallpa, Allard 2221, in part (us).
Huánuco: Muña, Bryan 469 (F, GH).
Pasco: Oxapampa, around Villa Rica, van der Werff et al. 8277 (MO, UC).
Junín: Chanchamayo Valley, C. Schunke 474 (F).
Ayacucho: Ayna, between Huanta & Río Apurímac, Killip & Smith 23130 (F, GH, NY, us).

42. **Elaphoglossum horridulum** (Kaulf.) John Sm., Bot. Voy. Herald 232. 1854.

Acrostichum horridulum Kaulf., Enum. fil. 58. 1824.
TYPE: Brazil, Otto (holotype, not located).

Stem compact, horizontal to ascending, ca. 2 mm in diameter, scales linear-lanceolate, entire, orange, lustrous, 3–5 mm long. **Phylloodia** lacking. Leaves fasciculate, 7–13 cm long, 0.5–0.9 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with scales subulate, orange to maroon, ca. 3 mm long, widely spreading, and with scattered minute erect glandular trichomes. **Lamina** narrowly to linear elliptic, chartaceous, apex acute, base narrowly cu-

neate. **Veins** obscure, free, 1.5–2 mm apart, at ca. 30-degree angle. **Hydathodes** evident. **Lamina scales** subulate, tan to dull orange, evenly distributed on both surfaces, and with minute, inconspicuous, gland-tipped trichomes. **Fertile leaves** $\frac{2}{3}$ as long to slightly surpassing the sterile in length, petiole $\frac{3}{4}$ – $\frac{7}{8}$ the fertile leaf length, lamina elliptic, apex obtuse, base broadly cuneate; intersporangial scales lacking.

Epipetric in wet forests, ca. 450 m, San Martín, Junín.

Venezuela; Peru; Bolivia; Brazil.

The Brazilian material is often somewhat smaller but there seems to be no substantial difference.

San Martín: Lamas, along Río Curiyacu, 8 km above San Antonio, Belshaw 3609 (F, GH, NY, UC, us). Near Tarapoto, Spruce 4040 (GH, NY, us).
Junín: Chanchamayo Valley, C. Schunke 474 (us).

43. **Elaphoglossum huacsaro** (Ruiz) Christ, Monogr. Elaphoglossum 96. 1899.

Acrostichum huacsaro Ruiz, Mem. sobre la legitima Calaguala, 57. 1805. TYPE: Peru, Ruiz 54 (B!, BR!); photos, F, us).
Acrostichum calaguala Klotzsch, Linnaea 20: 421. 1847. SYNTYPES; Peru, in Andium nemoribus, Ruiz 54 (B!, BR!); Colombia, Paramo de Mucute, Moritz 315 (not located).
Elaphoglossum calaguala (Klotzsch) Moore, Index fil. 7. 1857.

Stem short creeping to ascending, 3–5 (9) mm in diameter, scales linear-lanceolate, black, lustrous, entire, 1–2 mm long. **Phylloodia** indistinct. Leaves fasciculate, 14–31 cm long, 0.8–1.9 cm broad. Petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, with scales ovate, dark to pale, often pale with dark sclerotic tip, 1 mm long, entire, mostly appressed, a few spreading. **Lamina** narrowly elliptic, chartaceous, apex acute to obtuse, base narrowly cuneate. **Veins** obscure, free, ca. 1 mm apart, at ca. 60-degree angle. **Hydathodes** lacking. **Lamina scales** reduced to resinous dots on both surfaces, scales along lamina margin ovate and entire, ca. 1 mm long, some scattered on costa abaxially. **Fertile leaves** far exceeding the sterile in length, but lamina narrower, petiole nearly as long as the entire sterile leaf; intersporangial scales lacking.

Epiphytic in wet forests, 2050–3200 m, Cajamarca and Amazonas south to Huancavelica and Cuzco.

Mexico to Panama; West Indies; Colombia to Bolivia.

Cajamarca: San Miguel, Niepos, *Quiroz* 1539 (F). **Amazonas:** Chachapoyas, Cerros Calla Calla, 5 km above Leimebamba, *Hutchison & Wright* 4818 (F, NY, UC, US). Chachapoyas, cerros Calla Calla, west side, 45 km above Balsas, *Hutchison & Wright* 5799 (UC). Cordillera de Calla Calla, Balsas–Leimebamba road, *Duncan* 2607 (UC). **San Martín:** Huallaga, Valley of Río Apisoncho, *Hamilton & Holligan* 901 (k), 908 (UC). Mariscal Cáceres, near La Playa camp, Río Abiseo Nat. Park, *Young & León* 4950 (USM). **Huánuco:** W of Carpish, *Stork & Horton* 9892 (UC). Huánuco, Carpish Km 453, *Plowman* 6066 (GH). Huánuco–Tingo María road, *Luteyn* 5453 (UC). **Pasco:** Oxapampa, Canyon de Huancabamba, *León* 618 (F). Oxapampa, border of Yanachaga Nat. Park, *León et al.* 955 (F). **Junín:** Carapata above Huacapistana, *Killip & Smith* 24411 (NY), 24414 (UC, US). **Huancavelica:** Prov. Tayacaja, Quebrada, *Stork & Horton* 10312 (US). **Ayacucho:** Condorcunca, *Barron* 16 May 1964 (USM). **Apurímac:** E of Abancay, road to Cuzco, *Hutchison* 1733 (UC). **Cuzco:** Paucartambo, between Pillawata and Patria (Kosñipata Valley), *Plowman & Davis* 4939 (GH). Dist. Vilcabamba, Valle San Miguel Convención, Yungacalmarica, *Bües* 2056 (US).

44. *Elaphoglossum hystrix* (Kunze) Moore, Index fil. 10. 1857.

Acrostichum hystrix Kunze, *Linnaea* 9: 26. 1834.
TYPE: Peru, Huánuco, Pampayaco, *Poeppig* (holotype, LZ, destroyed; isotype, B?).

Stem lacking, probably compact, scales linear-lanceolate, lustrous, castaneous, 3–4 mm long, entire. **Phylloodia** present. **Leaves** approximate, 30–33 cm long, 1.4–1.8 cm broad. **Petiole** about $\frac{1}{5}$ the sterile leaf length, scales scattered, dark red-brown, subulate, patent, ca. 3 mm long, entire, and also with scattered, 2–3-celled, erect, glandular trichomes ca. 0.1 mm long. **Lamina** linear, chartaceous, apex acuminate, base cuneate. **Veins** evident, 1–1.7 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** adaxially scattered, red-brown, subulate, 1–1.5 mm long on surface, 1.5–2 mm long on margin, 1.5–2 mm long on costa, most abundant on margin and costa; abaxially abundant on costa, sparse on surface, and also with scattered, linear trichomidia ca. 0.2 mm long. **Fertile leaves** unknown.

Endemic. Habitat unknown but presumably epiphytic in wet forests. Huánuco, Junín.

Similar to *E. erinaceum* except: lamina linear elliptic, 1.4–1.8 cm broad, long-acuminate at apex, narrow at base.

Huánuco: Cuchero, *Poeppig*, July 1829 (photo of photo at BM). **Junín:** Villa Amoretti, *Kunkel* 535 (GH).

45. *Elaphoglossum jucundum* Mickel, sp. nov.

Rhizome repente squamis patulis fuscis obsito et lamina parva apice cuspidata abaxialiter glandulosa squamisque dentatis instructa notabile.

Stem wide-creeping, ca. 1 mm in diameter, scales linear, lustrous, dark reddish brown, 3–4 mm long, spreading and recurved, sparsely denticulate and with a few short cilia at scale base. **Phylloodia** present. **Leaves** 3–5 mm apart, 1.5–3.5 cm long, 0.6–1.1 cm broad. **Petiole** ca. $\frac{1}{3}$ the sterile leaf length, with scales linear-lanceolate, dark brown to orange, lustrous, 1.5–2 mm long, denticulate, ciliate at scale base, spreading, and with resinous dots. **Lamina** ovate-lanceolate, chartaceous, apex acuminate, base rounded. **Veins** obscure, ca. 1 mm apart, at ca. 60-degree angle. **Hydathodes** lacking. **Lamina scales** curved, ciliate, 1–1.5 mm long, mostly orange, some dark red-brown along abaxial costa, more abundant abaxially, with resinous dots on both surfaces. **Fertile leaves** unknown.

TYPE—Peru, Choquezuffa, al pie del Nevado, *Bües* 1379 (holotype, US!).

Endemic. Epiphytic in wet forests, ca. 900 m, Cuzco.

Thus far known only from the type.

46. *Elaphoglossum killipii* Mickel, sp. nov.

Ab *E. tenuiculo* fronde fertile steriles longe superanti, habitu epiphytico, regionis inferiosis incola diversum.

Stem short-creeping, 1.5–2 mm in diameter, scales linear, with twisted hairlike tip, lustrous, castaneous, 1–1.5 mm long, entire. **Phylloodia** present. **Leaves** approximate, 75–10 cm long, 2.5–3 cm broad. **Petiole** about $\frac{1}{5}$ the sterile leaf length, with dense scales appearing as stellate trichomes with resinous base. **Lamina** linear, chartaceous, apex acuminate, base attenuate. **Veins** not visible. **Hydathodes** lacking. **Lamina scales** appearing as stellate or substellate trichomes, adaxially white to orange, abaxially more abundant, orange, with resinous base. **Fertile leaves** longer than the sterile (to twice as long), petiole ca. $\frac{2}{3}$ the leaf length, lamina broader than the sterile (5–6 mm broad); intersporangial scales lacking.

TYPE—Peru, Junín, San Ramón, Killip & Smith 24772 (holotype, US!).

Endemic. Epiphytic in wet forests, 900–1300 m, Junín.

This is close to *E. tenuiculum* but distinct in the substellate trichomes rather than being strictly stellate, the fertile leaf much longer than the sterile, plants epiphytic rather than terrestrial, and occurring at lower elevation (900–1300 vs. 1500–3000 m).

47. ***Elaphoglossum laminariooides* (Fée) Moore,**
Index fil. 10. 1857.

Acrostichum laminariooides Fée, Mém. foug. 2: 57. t. 12. 1845. TYPE: French Guiana, Leprieur in 1834 (holotype, Pl!).

Stem short-creeping, ca. 3–5 mm in diameter, scales linear-lanceolate, lustrous, dark brown to black, 3–5 mm long, with short teeth. **Phylloodia** distinct. Leaves fasciculate, 32–104 cm long, 4.1–5.4 cm broad. Petiole about $\frac{1}{3}$ the sterile leaf length, with pale, appressed, round, peltate, ciliate scales ca. 1 mm long. **Lamina** narrowly elliptic, chartaceous, apex acuminate to cuspidate, base attenuate. **Veins** obscure, free, 1 mm apart, at ca. 80-degree angle. **Hydathodes** lacking. **Lamina scales** on both surfaces round, peltate, ciliate, white, 1 mm in diameter. **Fertile leaves** shorter than the sterile, petiole $\frac{1}{3}$ the fertile leaf length, the lamina linear, 9–12 mm wide; intersporangial scales lacking.

Epiphyte in wet forests, 600–1300 m, San Martín, Junín, Ayacucho, Cuzco.

Venezuela; Ecuador; Peru.

This plant has white, round, peltate, ciliate scales on the petiole and the lamina surfaces.

San Martín: Mariscal Cáceres, Palo Blanco, al oeste del Puente, Tocache Nuevo, J. Schunke V. 5673 (NY). Tingo María, Allard 21586 (GH, US). **Junín:** E of Quimirí Bridge, near La Merced, Killip & Smith 23960 (NY, US). Prov. Jauja, Valle de Sanibeni, Ridoutt 12262 (US). **Ayacucho:** Carrapa, between Huanta and Río Apurímac, Killip & Smith 22424 (NY). **Cuzco:** Machu Picchu, Coronado 109 (UC).

48. ***Elaphoglossum lanatum* Mickel, sp. nov.**

Laminae squamis appressis et costae obscuris ovato-lanceolatis erosio inferne dissectis ab *E. deorsum* diversa,

ab *E. nervoso* laminae squamis erectis longe ciliatis distantior.

Stem compact, horizontal, 4–7 mm in diameter, scales linear-lanceolate, lustrous, black, 3–5 mm long, dentate, at least toward base. **Phylloodia** present but hidden by scales. Leaves fasciculate, 15–38 cm long, 0.8–1.5 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the leaf length, scales orange, appressed, round, erose to short-ciliate, 1 mm in diameter, also with dark, ascending, lanceolate, erose scales 2–3 mm long. **Lamina** narrowly elliptic, chartaceous, apex obtuse, base narrowly to broadly cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** adaxially round to lanceolate, white-membranous (silvery), 1–2 mm long, erose, abaxially the dense, erect scales more or less round with long cilia, longer than scale body, costal scales broad-ovate, white, dark-centered, ovate, 1–2 mm long, adaxially round to lanceolate, white-membranous (silvery), 1–2 mm long, erose. **Fertile leaves** longer than the sterile, petiole $\frac{2}{3}$ – $\frac{3}{4}$ the fertile leaf length, lamina about equal the sterile in size and shape; intersporangial scales lacking, costa with ovate, white (dark-centered) ciliate scales 1–2 mm long.

TYPE—Peru, Apurímac, Abancay, E of Abancay, road to Cuzco, Hutchison 1732 (holotype, NY!; isotypes, Fl!, GH!, UC!, US!).

Endemic. Terrestrial on brushy roadcuts and steep slopes, 2050–3600 m, Amazonas, Lima, Junín, Ayacucho, Apurímac, Cuzco.

This is variable in the degree of ciliation of the laminar scales; i.e., the scale body ranges from substantial to only very slight.

Amazonas: Chachapoyas, Cerros Calla Calla above Leimebamba, Hutchison & Wright 4818A (NY, UC). Alrededores de Leimebamba, López et al. 4377 (GH). **Lima:** Caña, Huamantanga, Saunders 1253 (GH). **Junín:** Tarma, between Palca and Carpapata, Stork 10959 (UC). Huancayo, arriba de Huancayok, Tovar 2792 (GH). **Ayacucho:** Carrapa, between Huanta & Río Apurímac, Killip & Smith 22282 (NY). **Apurímac:** Abancay, laderas altas de Abancay, Vargas C. 16596 (GH). **Cuzco:** Paruro, Vargas C. 7914 (GH). **Department unknown:** Ruiz & Pavón (US ex Herb. Kew).

49. ***Elaphoglossum lasioglottis* Mickel, sp. nov.**

Ab *E. nigrocostato* lamina apice obtusa costaeque squamis latioribus dilutius nigris dissimile.

Stem compact, horizontal, 2–5 mm in diameter, scales linear, lustrous, castaneous to dark red-brown, 3–5 mm long, with sparse, sometimes deciduous hair-teeth. **Phylloodia** evident. Leaves fasciculate, 8–25 cm long, 0.6–1.2 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with dark red-brown to black scales appressed to spreading, 1–2 mm long, dentate, appearing resinous. **Lamina** narrowly elliptic, subcoriaceous, apex obtuse to acute, base cuneate. Veins obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially ovate-lanceolate, orange, ciliate, costa larger, lanceolate, red-brown, short-ciliate, adaxially pale orange, dense, round to lanceolate, 1–2 mm long, cilio-denticulate. **Fertile leaves** slightly shorter or longer than the sterile, petiole ca. $\frac{2}{3}$ the fertile leaf length, lamina about same size and shape as the sterile lamina; intersporangial scales lacking.

TYPE—Peru, La Libertad, Santiago de Chuco, Chota-Shorey, *Sagástegui* 11102 (holotype, NY!; isotype, GH!).

Epipetric in damp banks, rock crevices, and along streams, 2800–3250(–4200) m, Piura, Cajamarca, La Libertad, Ancash, Huancavelica.

Colombia to Bolivia.

This is closely related to *E. nigrocostatum* Mickel, of Venezuela.

Piura: Huancabamba, above Canchaque on road to Huancabamba, *Hutchison* 1644 (F, NY, UC). **Cajamarca:** San Miguel, Cerro Quillón (Agua Blanca), *Mostacero L. et al.* 1299 (F). **La Libertad:** Otuzco, Otuzco, above Agalpampa on road Trujillo-Quiruvilca, *Saunders* 893 (F, GH). 3 km west of Huamachuco, *Correll & E. Smith* P933 (GH). **Ancash:** Yungay, Huascarán Nat. Park, Quebrada Parla, *D. Smith et al.* 9173 (NY). **Huancavelica:** Tayacaja, 1 km before Huari, *Saunders* 1142 (F, GH).

50. *Elaphoglossum latevagans* Mickel, sp. nov.

Rhizome longe repenti squamis linearibus nigris induito necnon lamina lanceolata hydathodiis squamisque linearibus badiis provisa distinguibilis.

Stem long-creeping, 2–3 mm in diameter, often with some white patches, scales linear-lanceolate, lustrous, maroon, 1.5–2 mm long, entire. **Phylloodia** lacking. Leaves distant, mostly 5–20 mm apart, 30–47 cm long, 1.8–3.0(4.8) cm broad. Petiole about $\frac{1}{2}$ the sterile leaf length, scales scattered, linear, dark brown to tan, appressed to ascending, 2–3 mm long, more and darker distally, and extending onto lamina, those of costa with dark base

or center, those on lamina pale, on both surfaces, 2–5 mm long. **Lamina** lanceolate to narrowly elliptic, chartaceous, apex acuminate to caudate, base narrowly to broadly cuneate. **Veins** evident, free, ca. 1 mm apart, at ca. 60-degree angle. **Hydathodes** distinct. **Lamina scales** abaxially scattered, linear, tan, entire, 3 mm long, those on costa with reddish brown sclerotic streaks, adaxially similar but 2 mm long and lacking streaks on costal scales. **Fertile leaves** approximately equalling sterile ones in length, petiole about $\frac{2}{3}$ the fertile leaf length, lamina lanceolate, dark scales on costa and pale ones among sporangia.

TYPE—Peru, Amazonas, Chachapoyas, Cerros Calla Calla, *Hutchison & Wright* 5808 (holotype us!; isotypes, F!, GH!, NY!, UC!).

Endemic. No habitat data; 3100 m, Amazonas.

The paratype has a broader lamina (to 4.8 cm) than does the type material.

Amazonas: Chachapoyas, Cerros Calla Calla, *Hutchison & Wright* 5808A (GH).

51. *Elaphoglossum latifolium* (Sw.) John Sm., London J. Bot. 1: 197. 1842.

Acrostichum latifolium Sw., Prodr. 128. 1788. **TYPE:** Jamaica, *Swartz* (holotype, s).

Stem short to moderately creeping, 4–10 mm in diameter, scales linear-lanceolate, orange to dull tan or dirty brown to slightly blackish, occasionally somewhat lustrous, to 8 mm long, entire or with occasional hairlike processes. **Phylloodia** distinct. Leaves slightly to distinctly spaced, to 128 cm long, 4.9–9.8 cm broad. Petiole usually $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, glabrous. **Lamina** linear-lanceolate, coriaceous, apex acuminate, base cuneate to broadly cuneate. **Veins** obscure, free, about 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina surfaces** usually naked, but sometimes minute stellate black trichomidia on the abaxial surface. **Fertile leaves** about equal to the sterile ones in dimensions but sometimes slightly narrower or with longer petiole; intersporangial scales lacking.

Epiphytic in wet forests, 550–3800 m, Cajamarca, Amazonas, La Libertad, San Martín, Loreto, Huánuco, Pasco, Junín, Cuzco.

Mexico to Panama; West Indies; Venezuela and Colombia to Bolivia and Brazil.

This is placed in *E. latifolium* in the broad sense. In the narrow sense it is probably limited to the West Indies, but the complex is taxonomically very difficult. The Peruvian material has rather large leaves, with moderately creeping stems.

Cajamarca: Contumazá, bosque de Cachil (Cascas-Contumazá), Lopez M. et al. 9112 (F, GH). **Amazonas:** Chachapoyas, Cerros Calla Calla, 45 km above Balsas, midway on road to Leimebamba, Hutchison & Wright 5796 (F, GH, NY, UC, US). **La Libertad:** Otuzco, Huarranchal, Sagastegui A. 0199 (GH). **San Martín:** Mariscal Cáceres, Tocache Nuevo, Cerro Sinsin, 15 km W of Tocache, Plowman & Schunke V. 11463 (F). **Loreto:** Mishuyacu near Iquitos, Klug 1461 (F). **Huánuco:** Muña, Bryan 541 (F). Prov. Huánuco, Mirador, cerca a Huánuco, Ridout, Feb. 1940 (GH). **Pasco:** Oxapampa, Gran Pajonal, 2–3 km N of Chequitavio, D. Smith 5087 (NY). **Junín:** E of Quimirí Bridge near La Merced, Killip & Smith 23850 (NY). **Cuzco:** Pillahuata, Cerro de Cusilluyoc, Pennell 14027 (GH, NY).

52. *Elaphoglossum lawyerae* Mickel, sp. nov.

Rhizomate compacto, frondibus subsessilibus linear-ellipticis glabris distinguendum.

Named for Jean Lawyer, who was a volunteer in my office for fifteen years, helping in matters of curation, research, and the American Fern Society.

Stem compact, ca. 5 mm in diameter, scales lanceolate, black, dull, thin, 3–4 mm long, with occasional irregular teeth. **Phylloodia** present. Leaves approximate, 34–42 cm long, 1.8–2.4 cm broad. **Petiole** $\frac{1}{15}$ – $\frac{1}{10}$ ($\frac{1}{5}$) the sterile leaf length, glabrous. **Lamina** linear-elliptic, firmly chartaceous, apex acuminate, base attenuate. **Veins** evident, 1–1.5 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** lacking, but sparse, stellate trichomidia on both surfaces. **Fertile leaves** nearly equalling the sterile in length, petiole ca. $\frac{1}{3}$ the leaf length, lamina broader than the sterile (2.8 cm); intersporangial scales lacking.

TYPE—Peru, Pasco (as Junín), Pichis Trail, between San Nicolás and Azupizú, Killip & Smith 26122 (holotype, NY!).

Endemic. Epiphytic in wet forests, 650–900 m, Pasco.

Thus far known only from the type.

53. *Elaphoglossum laxisquama* Mickel, sp. nov.

Lamina magna laxe squamata necnon stipite hirta insignis.

Stem moderately to short-creeping, to 20 cm long, 2–3 mm in diameter, scales linear-lanceolate, lustrous, red-black, 5–7 mm long, with hair-tip and divergent hair-teeth. **Phylloodia** evident. Leaves approximate, to 5 mm apart, 25–53 cm long, 2.0–4.1 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with tan to black-streaked scales widely spreading, 3–5 mm long, with hairlike teeth. **Lamina** narrowly elliptic, coriaceous, apex obtuse, base broadly cuneate to rounded or truncate. **Veins** obscure, free, 1 mm apart, at 80-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially ovate to lanceolate, 1–1.5 mm long with long, hairlike teeth, scattered, concentrated at margin, orange to black, costal scales 2–3 mm long, dense, adaxial surface glabrescent or with scattered scales, these 1–2 mm long, orange. **Fertile leaves** longer than the sterile, petiole $\frac{1}{4}$ the leaf length, lamina narrower; intersporangial scales lacking.

TYPE—Peru, San Martín, Mariscal Cáceres, Puerta del Monte, Río Abiseo Nat. Park, Young 1741 (holotype, NY!; isotype, USM!).

Endemic. Terrestrial and epiphytic in wet forests, 3300–3500 m, La Libertad, San Martín, Pasco, Cuzco.

La Libertad: Patáz, Chirimachay, Patáz, Young 2960 (NY, USM). **San Martín:** Mariscal Cáceres, forest patch above timberline, Puerta del Monte, Río Abiseo Nat. Park, Young 1847, 1951 (NY). Mariscal Cáceres, Chochos, Río Abiseo Nat. Park, Young 2536 (NY). Mariscal Cáceres, Puerto del Monte, Río Abiseo Nat. Park, Young 1926, 1995 (USM). **Pasco:** Oxapampa, Huancabamba, Sta. Barbara, above Lanturachi, Foster 10429 (F, GH). **Cuzco:** La Convención, Cordillera Vilcabamba, 28 km walking distance NE from Hacienda Luisiana & Apurímac River, Dudley 11188 (GH).

54. *Elaphoglossum lechlerianum* (Mett.) Moore, Index fil. 11. 1857.

Acrostichum lechlerianum Mett., Fil. lechl. 1: 3. 1856.

TYPE: Peru, Puno, Tatanara, Lechler 2522 (isotypes, BR!, Sl!; photo, US of BR).

Stem creeping, up tree, vertical, ca. 4–6 mm in diameter, scales linear-lanceolate, lustrous, orange, 4–6 mm long, with a few low teeth distally and an occasional hairlike process. **Phylloodia** present. Leaves fasciculate, 26–52 cm long, 2.2–4.2 cm broad. **Petiole** $\frac{1}{8}$ – $\frac{1}{4}$ the sterile leaf length, with orange scales scattered, appressed, ovate to lanceolate, 1–2 mm long, entire. **Lamina** narrowly elliptic, chartaceous, apex acuminate, base attenu-

uate. Veins evident, free, 1–1.5 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially reduced to minute, stellate trichomidia, a few appressed scales on the costa base, adaxially smaller and sparser. **Fertile leaves** about equal the sterile, petiole $\frac{1}{3}$ – $\frac{1}{2}$ the fertile leaf length, the lamina narrow linear-elliptic to linear-oblan- ceolate, 1.0–2.8 cm broad; intersporangial scales lacking.

Terrestrial and epiphytic in wet forests, 1760–2770 m, Amazonas, Huánuco, Pasco, Cuzco, Puno. Ecuador; Peru.

Amazonas: Bagua, 25 km E of La Peca, *Barbour* 2954 (MO). Bagua, 17 km E of La Peca, *Gentry et al.* 22977 pp (MO). **Huánuco:** SW slope of Río Llullapichis watershed on ascent of Cerros del Sira, *Dudley* 13328 (GH). Prov. Huánuco, Carpish, *C. Vargas C.* 5424 (UC). **Pasco:** Chontabamba, Abra "La Suiza," camino al Río Chon- tabamba, *León et al.* 978 (F). Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff et al.* 8427 (MO, UC). **Cuzco:** La Convención, Huayopata, 6 km from Incatambo on Lucumayo River, *Peyton & Peyton* 1557 (MO). La Convención, Cordillera Vilcabamba, camp 1– $\frac{1}{2}$, *Dudley* 10342 (GH). La Convención, 15 km walking NE from Hacienda Luisiana & Apurímac River, Cordillera Vilcabamba, *Dudley* 11248 (GH). La Convención, Huayopata, Puncuyoj, 10 km SW of Incatambo, *Peyton & King* 1413 (GH). Machu Picchu, *Cook & Gilbert* 863 (us). Los Palmitos, Cabecera del Río Kariben, *Bües* 1962 (us).

55. *Elaphoglossum leprosum* (Kuhn) Christ, Monogr. Elaphoglossum 119. 1899.

Acrostichum leprosum Kuhn, Linnaea 36: 48. 1869. TYPE: Peru (Junín), Tarma, *Phillipi* (holotype, B!).

Stem creeping, ca. 2 mm in diameter, scales linear, lustrous, dark brown, 4–6 mm long, with short, patent teeth. **Phylloodia** evident but obscured by scales. Leaves 2–15 mm apart, 16–20 cm long, 1.8–2.1 cm wide. Petiole $\frac{1}{3}$ – $\frac{2}{5}$ the sterile leaf length, with tan, black-centered scales widely spreading, 3 mm long, with short patent teeth, also with appressed, peltate, ciliate scales to 1 mm long. **Lamina** lanceolate, chartaceous, apex long-acuminate, base broadly cuneate. Veins obscure, free, ca. 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially dense, most of them lanceolate, orange, ciliate, 2 mm long, costal scales (some) sclerotic in part, plus a few lanceolate scales with sclerotic patches, adaxially white, lanceolate, ciliate. **Fertile leaves** longer than

the sterile, petiole $\frac{1}{2}$ the fertile leaf length, lamina similar to the sterile except slightly narrower; intersporangial scales lacking.

Endemic. Epiphytic in wet forests, 3950 m, Huánuco, Junín.

Huánuco: Tambo de Vaca, *Macbride* 4413 (F).

56. *Elaphoglossum lindenii* (Fée) Moore, Index fil. xvi. 1862.

Acrostichum lindenii Fée, Mém, foug. 2: 48, t. 18, f. 3. 1845. TYPE: uncertain, four syntypes originally cited.

Stem short-creeping to ascending, ca. 3 mm in diameter, scales linear, maroon, to 8 mm long, with short teeth. **Phylloodia** lacking. Leaves fasciculate, 7–13 cm long, 1.4–2.4 cm broad. Petiole $\frac{1}{2}$ – $\frac{3}{4}$ the sterile leaf length, the scales orange, subulate, widely spreading, 2–3 mm long and also with a few minute erect glandular trichomes. **Lamina** ovate to widely elliptic, chartaceous, apex cuspidate, base rounded or subcordate. Veins evident, free, ca. 2 mm apart, at 60–70-degree angle. **Hydathodes** distinct. **Lamina scales** subulate, orange to maroon, scattered on both surfaces, 2–3 mm long. **Fertile leaves** slightly shorter than the sterile, petiole to $\frac{4}{5}$ the fertile leaf length, the lamina apex obtuse, base truncate; intersporangial scales lacking.

Epipetric or terrestrial in wet forests, 3700–3840 m, Cajamarca, Ancash, Cuzco.

Mexico to Panama; Venezuela and Colombia to Chile.

Cajamarca: Prov. San Miguel, El Tingo, *Sagástegui* 8824 (UC). **Ancash:** Yungay, Huascarán Nat. Park, *D. Smith et al.* 10470A (NY). Prov. Yungay, Yungay, Llanguanuco, *Saunders* 521 (F, UC). **Cuzco:** Paucartambo, Huaisampillo, *Vargas C.* 9963 (UC).

57. *Elaphoglossum lingua* (Raddi) Brack., U.S. Expl. Exped. 16: 74. 1854.

Acrostichum lingua Raddi, Opusc. Sci. 3: 283. 1819. TYPE: Brazil, Raddi (fl or pi).

Stem long-creeping, ca. 2 mm in diameter, scales sparse, ovate to lanceolate, black, sclerotic, lustrous, 1–2 mm long, with cilia, especially at base.

Phylloodia present but not always dark. Leaves distant, mostly 1–3 cm apart, 9–30 cm long, 3.1–5.2 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{1}{2}$ the sterile leaf length, glabrous or with sparse black or black-tipped scales near petiole base. **Lamina** ovate to lanceolate or oblong, coriaceous, apex obtuse to acute, base narrowly to broadly cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** lacking, or reduced abaxially to stellate trichomidia. **Fertile leaves** about equal the sterile in length, petiole $\frac{1}{2}$ – $\frac{2}{3}$ the fertile leaf length, the lamina narrowly oblong; intersporangial scales lacking.

Epiphytic in wet forests, 550–1900 m, San Martín, Huánuco, Pasco, Junín, Cuzco.

Costa Rica; Panama; West Indies; Venezuela; Colombia to Bolivia and Brazil.

San Martín: Mariscal Cáceres, Tocache Nuevo, Cerro Sinsin, 15 km W of Tocache Nuevo along road to Puerto Pizana, *Plowman & J. Schunke* V. 11460 (F, NY). **Huánuco:** Dist. Churubamba, Puente Durand to Exito, *Mexia* 823a (UC). SW slope of Río Llullapichis watershed on ascent of Cerros del Sira between Laguna & Pelogroso, *Dudley* 13205 (GH). Pachitea, slopes in logging area across Río Huancabamba from town Pozuzo near bridge of Oxapampa–Pozuzo road, *Skog et al.* 5095 (NY). Cani, *Macbride* 3403, in part (US). **Pasco:** Oxapampa, Oxapampa to villa Rica, *Skog et al.* 5046b (US). Oxapampa, Quebrada Castilla on the Omaiz river, *León & Young* 1069 (F). **Junín:** Satipo, Pichanaki, rodal del proyecto Peruano-Aleman, *León* 231 (USM). Chanchamayo Valley, *C. Schunke* 473, 1441, 1465 (F). E of Quimirí Bridge near La Merced, *Killip & Smith* 23992 (NY, US). Pichis Trail, Porvenir, *Killip & Smith* 25916 (NY, US), 25698 (US). **Cuzco:** Paucartambo, entre Montañesa & Patria, *C. Vargas* C. 16890 (GH).

58. *Elaphoglossum litanum* (Sodiro) C. Chr., Index fil. 310. 1905.

Acrostichum litanum Sodiro, Sert. fl. ecuad. 10. 1905. TYPE: Ecuador, "ad fl. Lita in prov. Esmeraldas," Sodiro, Aug 1904 (holotype, Pl; isotypes B!, Pl).

Stem compact, 5–8 mm in diameter, scales linear-lanceolate, lustrous, dark red-brown, ca. 5 mm long, entire. **Phylloodia** not evident, perhaps very short and obscured by crowded, stout petiole bases. **Leaves** approximate, 48–60 cm long, 2.5–4.0 cm broad. **Petiole** about $\frac{1}{10}$ the sterile leaf length, scales ovate-lanceolate, pale, dull, appressed, 2–3 mm long, erose. **Lamina** linear-oblanceolate, chartaceous, apex acute-acuminate, base attenuate.

Veins evident, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** adaxially deciduous except for fringe of 1 mm, pale, cilio-denticulate scales at margin; abaxially glabrous except for much-reduced fimbriate scales on costa. **Fertile leaves** slightly shorter than the sterile, petiole ca. $\frac{3}{5}$ the leaf length, lamina obtuse, slightly narrower than the sterile, adaxial surface densely clothed with pale, round to lanceolate, cilio-denticulate, 1 mm long scales; intersporangial scales lacking.

Endemic. Epiphytic in wet forests, 1800–1900 m, San Martín.

This closely resembles *E. subciliatum* Rosenst. of Costa Rica, but that has a linear, fertile lamina.

San Martín: Rioja, Pedro Ruiz-Moyobamba road, *D. Smith* 4503 (UC).

59. *Elaphoglossum longius* Mickel, sp. nov.

Ab *E. tenui* stipite laminaque longioribus, laminaque ipsa squamis basi ciliolatis dorsaliter obsita semovenda.

Stem long-creeping, 1 mm in diameter, scales linear, lustrous, dark red-brown, 2–3 mm long, minutely and sparsely dentate. **Phylloodia** present. **Leaves** 1–1.5 cm apart, 18–34 cm long, 1.6–2.5 cm broad. **Petiole** ca. $\frac{3}{5}$ the sterile leaf length, scales scattered, linear, orange-tan, 2–3 mm long, minutely denticulate, and smaller ones appressed, more dissected. **Lamina** narrowly elliptic, chartaceous, apex long-attenuate, base cuneate. **Veins** evident, 1.5 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** scattered on both surfaces, linear-lanceolate-deltate adaxially, abaxially lanceolate, ciliate-denticulate with glandular dots. **Fertile leaves** nearly equalling the sterile in length, petiole $\frac{3}{5}$ the leaf length, lamina nearly equalling the sterile in size and shape; intersporangial scales lacking.

TYPE—Peru, Cuzco, Abra de Malaga, 15 km toward Quillabamba, *Ellenberg* 4863 (holotype, GH!).

Endemic. Epiphytic in mossy elfin forests, 3740 m, Cuzco.

Similar to *E. tenui* except petiole 10–17 cm long, scales scattered, leaves longer, 22–34 cm, 1.7–2.5 cm broad, lamina scales abaxially deltate-lanceolate, ciliate-based, gland-based, adaxially linear-

lanceolate, scattered; fertile lamina same shape and nearly same size as sterile.

60. *Elaphoglossum luridum* (Fée) Christ, Monogr. Elaphoglossum 33. 1899.

Acrostichum luridum Fée, Mém. foug. 2: 35. t. 19, f. 1. 1845. SYNTYPES: "Guiana" (Guyana), Oyapoc, Leprieur 56 (p!); 385 (p!); "British Guiana" (Guyana), Melinon 373 (p!); Schomburgk 450 (BM!).

Acrostichum schomburgkii Fée, Mém. foug. 2: 32. t. 8, f. 2. 1845. TYPE: "British Guiana" (Guyana), Schomburgk 450 (holotype, p!).

Elaphoglossum schomburgkii (Fée) Moore, Index fil. 14. 1857.

Stem compact, horizontal, ca. 6–10 mm in diameter, scales linear-lanceolate, lustrous, brown to blackish brown, 7–12 mm long, with hairlike processes. **Phylloodia** present. **Leaves** fasciculate, 26–78 cm long, 5.0–7.6 cm broad. **Petiole** about $\frac{1}{10}$ the sterile leaf length, with black scales appressed to spreading, 3–6 mm long, some further reduced and skeletonized with irregular hairlike processes. **Lamina** oblanceolate to broadly elliptic, coriaceous, apex acuminate, base narrowly cuneate. **Veins** obscure, free, 1–1.5 mm part, at 80-degree angle. **Hydathodes** lacking. **Lamina** abaxially glabrous, adaxially with black skeletonized scales, especially toward lamina base and reduced to stellate trichomidia. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{5}$ the fertile leaf length, the lamina oblanceolate to elliptic, 3–3.5 cm wide; intersporangial scales lacking.

Epiphytic in wet forests, 100–1200 m, San Martín, Loreto, Pasco, Junín, Ucayali, Madre de Dios.

Costa Rica; Panama; West Indies; Trinidad; Guianas; Venezuela; Colombia to Bolivia and Brazil.

San Martín: Mariscal Cáceres, Palo Blanco, at oeste del Puente, Tocache Nuevo, J. Schunke V. 5759 (NY). Tingo María, Allard 21396 (us). **Loreto:** Maynas, Napo, environs of Río Santa María, on trail S of Secoya village of Vencedor, King 501 (f). **Pasco:** Oxapampa, Gran Pajonal, trail to Shumahuani from Chequitavo, D. Smith 5218 (MO, NY, UC). **Junín:** La Merced, Killip & Smith 24013 (NU, US). **Ucayali:** Aguaytía, Ridout 13091 (us). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, Foster 10754 (f).

61. *Elaphoglossum macilentum* Mickel, sp. nov.

Ab *E. squamipedii* lamina sterili anguste elliptica et lamina fertili linear-elliptica, ulterius stipitis squamis lanceolatis semota.

Stem long-creeping, ca. 1 mm in diameter, scales linear-lanceolate, dull orange-tan, 2–4 mm long, entire. **Phylloodia** lacking. **Leaves** 3–14 mm apart, 7–12 cm long, 0.7–1.1 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with tan-orange scales widely spreading, ovate-lanceolate, 2–3 mm long, subentire, with sparse irregular teeth. **Lamina** narrowly elliptic, chartaceous, apex acute to acuminate, base narrowly cuneate. **Veins** evident, free, 1 mm apart, at 40–60 degree angle. **Hydathodes** lacking. **Lamina scales** very sparse, mostly along abaxial costa. **Fertile leaves** slightly longer than the sterile, petiole $\frac{3}{4}$ the leaf length, lamina linear-elliptic, 1.8–2.5 cm long, 4–5 mm broad; intersporangial scales lacking.

TYPE—Peru, Madre de Dios, Prov. Manú, Parque Nac. Manú, Río Manú, Río Cumerjali, Foster 11978 (holotype, f!).

Endemic. On log in wet forest, 350–450 m, Madre de Dios.

Similar to *E. squamipes* except: leaves generally more slender, petiole scales lanceolate to ovate-lanceolate rather than ovate, sterile lamina narrowly elliptic instead of ovate-lanceolate, apex acute to acuminate, base cuneate, fertile lamina linear-elliptic, lamina scales very sparse, vein angle more acute. *Elaphoglossum macilentum* differs from *E. lloense* (Hooker) Moore (Venezuela, Colombia, Ecuador) in the petiole scales appressed, not spreading, and the lamina scales tan, not dark.

Thus far known only from the type.

62. *Elaphoglossum mathewsi* (Fée) Moore, Index fil. 12. 1857.

Acrostichum mathewsi Fée, Mém. foug. 2: 54, t. 2, f. 2. 1845. TYPE: Peru, Mathews (holotype, presumably p; frag., b!).

Elaphoglossum longipes Brack., U.S. Expl. exped., Filic. 16: 70. t. 9, f. 2. 1854. TYPE: Peru, Andes, Baños, Brackenridge (holotype, us!).

Stem short- to moderately creeping, 2–3 mm in diameter, scales linear-lanceolate, dark red-brown to red-black, lustrous, denticulate, ca. 3 mm long. **Phylloodia** distinct. **Leaves** spaced, to 1 cm apart, 12–32 cm long, 1.0–1.8 cm broad. **Petiole** $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, the scales mostly 1–3 mm long, lustrous brown, sclerotic, with pale margin, appressed to slightly spreading, dentate to ciliate near base. **Lamina** narrowly elliptic, subcoriaceous, apex acuminate to acute or obtuse, base cuneate. **Veins** inconspicuous, free, 0.8–1 mm

apart, 60–70-degree angle. **Hydathodes** present but inconspicuous. **Lamina scales** of adaxial surface generally abundant and usually overlapping, lanceolate to deltate, peltate, brown with pale margins, abaxial surface often essentially glabrous, sometimes glandular, occasionally with scattered scales, these ciliate, especially toward base. **Fertile leaves** slightly longer than the sterile, petiole $\frac{2}{3}$ – $\frac{3}{4}$ the fertile leaf length; scales sparse on abaxial costa, lacking among the sporangia.

Terrestrial or epipetric, 3200–5100 m, Cajamarca south to Huancavelica and Madre de Dios.

Mexico to Costa Rica; Venezuela and Colombia to Chile.

I include here *E. longipes*, which may be a distinct taxon. However, the only difference seems to be the very long petiole and linear lamina.

Elaphoglossum mathewssii specimens: Cajamarca: Hualgayoc, Soukup & Carmons 5015 (GH). Prov. Cajamarca, Encanada, Komolka, Sánchez 193 (GH). Cajamarca, 28 km NW of Cajamarca on road to Pedernal, Ugent & Ugent 5461 (GH). La Libertad: Otuzco, Angulo 1701 (GH). Bolívar, arriba de Bolívar, Lopez & Sagastegui 1620 (NY), 3221 (GH). Ancash: Carhuaz, Huascarán Nat. Park, Quebrada Ishinca, D. Smith & Budensiek 11265 (NY). Huánuco: Mito, Bryan 202 (F). Tambo de Vaca, Macbride 4387 (F, us), Bryan 654, 699 (F). Lima: Canta, Carhuai, Aclclo 219 (USM). Junin: La Quinua, MacBride & Featherstone 2026 (F, us). Huancayo, 11 km from Huancayo towards Chameseria, Saunders 652 (GH). Huancavelica: Tayacaja, Pampas, Gutte 1074 (USM). Ayacucho: 14 km NE of La Quinua, Luteyn 6339 (NY). Cuzco: Urubamba, trail from Ch'uso to Cuzco, 2 hrs walk from Chincherro, King et al. 215 (F, NY). Madre de Dios: Pinasniocj, Pantiacolla Pass, Cook & Gilbert 1839 (us).

Elaphoglossum longipes specimens: Pasco: Valle del Paucartambo, hacienda Churu, Herrera 1643 (us). Junin: Huancayo, Soukup 2009 (GH). Cuzco: Saxaihuamán hills, Herrera 159 (us). Paucartambo, Hacienda Chura, Herrera 273 (GH, us). Urubamba, Chincheros, S. King et al. 289 (F, NY). Quispicanchi, Marcapata, Vargas 13447 (GH). Prov. Cuzco, San Jerónimo, v.d. Hoogte & Roersch 274 (F).

63. *Elaphoglossum megalurum* Mickel, sp. nov.

Elaphoglossum auricomum quoad laminae squamas dissecatas et stipitem abbreviatum simulans, sed stipitis squamae latiores et laminae apice caudatae sunt.

Stem short creeping, ca. 2 mm in diameter, scales lanceolate, lustrous, brown, ca. 1 mm long, entire, more or less resinous. **Phylloodia** evident. **Leaves** approximate, 21–30 cm long, 1.9–2.4 cm broad. **Petiole** $\frac{1}{6}$ the sterile leaf length, with tan scales

appressed to spreading, 1–2 mm long, cilio-denticulate. **Lamina** narrowly elliptic, chartaceous, apex cuspidate to caudate, base cuneate. Veins evident, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially and adaxially substellate, adaxially glabrescent with age, abaxial costal scales 1.5–2 mm long, pale, lanceolate, ciliate. **Fertile leaves** not known.

TYPE—Peru, Pasco, Oxapampa, Quebrada Castilla on the Omaiz river, León & Young 1071 (holotype, F!).

Endemic. Epiphyte in wet forests, elevation unknown, Pasco.

Thus far known only from the type.

64. *Elaphoglossum meladenium* Mickel, sp. nov.

Ab *E. latifolio* lamina linearis et stipitis squamis aurantiacis sparsis abstat.

Stem creeping, ca. 4 mm in diameter, scales lanceolate, lustrous, orange, tinged dark brown with age, 7–9 mm long, entire. **Phylloodia** present. **Leaves** 2–8 mm apart, 25–41 cm long, 2.5–4.0 cm broad. **Petiole** $\frac{2}{5}$ – $\frac{3}{5}$ the sterile leaf length, with scattered orange scales widely spreading toward petiole base, these 4–6 mm long, entire, the lamina surface also with glandular dots, and with spores adhering to the scales to give an appearance of black dots. **Lamina** lanceolate to elliptic, chartaceous, apex acute, base broadly cuneate. Veins obscure, free, 1 mm apart, at ca. 80-degree angle. **Hydathodes** lacking. **Lamina scales** on both surfaces with black dots, dark with spores attached plus occasional 1–2 mm ovate scales along costa. **Fertile leaves** slightly longer than the sterile, petiole $\frac{3}{5}$ – $\frac{3}{4}$ the fertile leaf length, lamina narrower than the sterile, 1.9–2.3 cm broad; intersporangial scales lacking.

TYPE—Peru, Ancash, Yungay, alrededores Laguna Llanganuco, Mostacero L. et al. 1408 (holotype, NY!; isotypes, F!, HUT!).

Endemic. Terrestrial and epipetric in wet forests, 3750–4100 m, Ancash, Cuzco.

Ancash: Huari, Huascarán Nat. Park, slopes & valley of Laguna Ichicpotrero, D. Smith et al. 12380 (NY). **Cuzco**: Calca, Amparaes, SW from Cuzco, Nuñez 6726 (MO).

65. *Elaphoglossum melancholicum* Vareschi, Act. Bot. Venez. 1: 109. t. 10B. 1966.

TYPE: Venezuela, Mérida, Páramo Monsalves, Vareschi 2217 (holotype, VEN).

Stem wide-creeping, branched, ca. 2–4 mm in diameter, scales linear-lanceolate, lustrous, black, sclerotic, 3–5 mm long, with sparse, irregular teeth. **Phylloodia** evident. **Leaves** 1.5–4 cm distant, (7)18–50 cm long, (0.9)2.8–4.8 cm wide. **Petiole** ($\frac{1}{6}$) $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, glabrous. **Lamina** lanceolate to elliptic, coriaceous, apex acuminate, base cuneate to rounded. **Veins** evident, free, 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** on abaxial surface scattered, linear to linear-dentate, black, sclerotic, ca. 1 cm long; slightly longer on costa, adaxially with a few by the costa. **Fertile leaves** slightly longer than the sterile, petiole ($\frac{1}{4}$) $\frac{2}{3}$ the fertile leaf length, the lamina about the same shape and width as the sterile or with truncate base; intersporangial scales lacking.

Epiphytic and epipetric, 3000–3400 m, La Libertad, San Martín, Huánuco, Junín.

Venezuela; Colombia; Ecuador; Peru.

Elaphoglossum megarhizon Rosenst. of Bolivia is similar, and if they prove to be the same species, that would be the correct name.

Piura: Huancabamba, above Canchaque, Hutchison 1636 (UC). **La Libertad:** Pataz, Puerta del Monte, Paso La Sábana, Lopez & Sagástegui 3464 (GH). Pataz, Young 2985 (NY, USM). **San Martín:** Mariscal Cáceres, Rio Abiseo Nat. Park, Puerta del Monte, Young 1682 (NY). **Huánuco:** Tingo María, Allard 1049 (US). Tambo de Vaca, Bryan 652 (F, US). **Junín:** Concepción, Comas, km 39, road Concepción-Satipo, Saunders 1049 (GH). **Cuzco:** Machu Picchu, Soukup 178 (F).

66. *Elaphoglossum metallicum* Mickel, sp. nov.

Lamina vivide aurea utraque facie aequabiliter squamulis parvis dissectis nigris obsita singularis.

Stem short-creeping, ca. 4–6 mm in diameter, scales linear-lanceolate, lustrous, orange tinged with dark brown, 9–14 mm long, with hairlike processes. **Phylloodia** present. **Leaves** 3–6 mm distant, 22–67 cm long, 3.7–5.5 cm wide. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with black scales appressed, skeletonized, 1 mm long, with long irregular, processes. **Lamina** lanceolate to broadly elliptic, coriaceous, margin inrolled, apex acute to obtuse, base broadly cuneate. **Veins** evident, free, 1–1.5 mm apart, at ca. 30-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially with scat-

tered skeletonized, reddish-brown scales 1 mm long, adaxially fewer, glabrescent. **Fertile leaves** shorter than the sterile, petiole $\frac{1}{2}$ the fertile leaf length, the lamina narrow, 2.1 cm wide, narrowly lanceolate; intersporangial scales lacking.

TYPE—Peru, San Martín, Zepelacio, near Moyobamba, Klug 3636 (holotype, NY; isotypes, F!, GH!, K!, MO!, us!).

Endemic. Epiphytic (?) in wet forests, 750–1100 m, San Martín, Huánuco.

San Martín: Tarapoto, Ll. Williams 5986 (F). **Huánuco:** SW slope Río Llullapichis watershed on ascent of Cerros del Sira, Dudley 13169 (GH), 13264 (GH).

67. *Elaphoglossum minutum* (Fée) Moore, Index fil. 12. 1857.

Acrostichum minutum Fée, Mém. foug. 2: 39. t. 10, f. 3. 1845. TYPE: Brazil, near Goyaz, Pohl (holotype, w).

Acrostichum unitum Fée, Mém. foug. 2: 44. 1845. SYNTYPES: Peru, Dombey (holotype, F!, photo, us); Mexico, Mt. Orizaba, Galeotti?; “Martiniaca,” Desvaux (F?).

Acrostichum leptophyllum Fée, Mém. foug. 2: 45. t. 17, f. 1. 1845, not Lam. & DC., 1805. TYPE: Brazil, Blanchet 548 (holotype, F!).

Elaphoglossum leptophyllum (Fée) Moore, Index fil. 11. 1857.

Stem short- to moderately creeping, 2–3 mm in diameter, scales ovate to (ovate-lanceolate) linear-lanceolate, orange or tan with varying degrees of dark, shiny, sclerotic streaking, ca. 3 mm long, entire or with occasional small, irregular hairlike processes. **Phylloodia** distinct. **Leaves** spaced 1–8 mm apart, 6–38 cm long, 0.6–1.4 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{1}{2}$ the sterile leaf length, glabrous or with tan, ovate scales. **Lamina** linear-elliptic, apex acute to obtuse, base attenuate. **Veins** obscure, free, ca. 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. **Lamina scales** sparse, minute, stellate hairs or dots on abaxial surface, rare on adaxial surface. **Fertile leaves** longer than the sterile, petiole ($\frac{1}{3}$ –) $\frac{1}{2}$ – $\frac{3}{4}$ the leaf length, the lamina similar to the sterile in size and shape; intersporangial scales lacking.

Terrestrial in wet forests, cliffs, grassy slopes, and roadsides, (800)–2400–3700 m, Piura to Amazonas, south to Huancavelica and Puno.

Costa Rica; Panama; Jamaica; Hispaniola; Venezuela and Colombia to Bolivia.

Piura: Huancabamba, Mitopampa (Huancabamba-Cuello del Indio), *Sagástegui* 8238 (F, HUT, NY, UC). **Lambayeque:** Ferreñafe, 7 km NW of Incahuasi near Cerro Punamachay on trail to Laguna Hualtaco, *Dillon & Skillman* 4116A (F). **Cajamarca:** Contumazá, Tambo La Lima (Cascas-Contumazá), *López* M. 9029 (F, GH, UC). **Amazonas:** Chachapoyas, Cerros Calla Calla, 45 km above Balsas, road to Leimebamba, *Hutchison & Wright* 5806 (F, GH, NY, UC). **La Libertad:** Trujillo, Cerro Campana, *Sagástegui* 12917 (F). **San Martín:** Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, *Young & León* 4685 (USM). **Ancash:** Huaráz, Huascarán Nat. Park, Quebrada Shallap, *D. Smith et al.* 10777 (NY). **Huánuco:** Mito, *Bryan* 369 (F). **Lima:** San Bartolome, Bosque de Zarate, Huarochirí, *León* 907 (F, NY). **Pasco:** Border Prov. Oxapampa and Pasco, San Cotardo, *van der Werff et al.* 8526 (UC). **Junín:** Huancayo, *Kunkel* 441 (GH). **Huancavelica:** Tayacaja, Quebrada SE of Salcabamba, *Stork & Horton* 10312 (F). **Ayacucho:** Pampalca, between Huanta & Apurímac, *Killip & Smith* 23267 (NY). **Cuzco:** "Pillahuata," Cerro de Cusilluyoc, *Pennell* 14112 (GH, NY, US). **Puno:** Sandia, S of Limbani, *Metcalf* 30437 (UC, US).

The following specimens are flocculose abaxially, with sparse, dissected scales resembling tufts of wool. They occur at 1000–2900 m, are on limestone or epiphytic.

Cajamarca: 25 km E of Cajamarca, *Dillon et al.* 2892 (F). **Pasco:** Oxapampa, Canyon de Huancabamba, fundo La Esperanza, *León* 619 (F). **Cuzco:** La Convención, between Santa Teresa and Chaulay, *Nuñez & Motocanchi* 8789 (MO).

Some specimens are larger than the usual, with longer petiole (ca. $\frac{1}{2}$ the leaf length), wider, obtuse lamina, and nearly naked stem. They may represent *E. affine* (Mart. & Gal.) Moore. These are:

Cajamarca: Contumazá, Pampa de la Sal, *Sagástegui* 10743 (F, NY). **Ancash:** Carhuaz, Huascarán Nat. Park, Quebrada Ishinca, *Smith & Buddinsiek* 11258 (NY).

68. *Elaphoglossum moyeri* Mickel, sp. nov.

Ab *E. papilloso* lamina anguste elliptica necnon stipite gracili diversum.

Named for Dr. Arden Moyer, who is a volunteer in my office, helping with curatorial and research projects.

Stem compact, ca. 4 mm in diameter, scales linear-lanceolate, lustrous, dark red-brown, very indurated, entire, ca. 1 mm long. Leaves approximate, 22–23 cm long, 1.8–2.5 cm broad. Petiole about $\frac{1}{5}$ the leaf length, glabrous. Lamina narrowly elliptic, chartaceous, apex long-acuminate, base

narrowly cuneate. Veins evident, 1 mm apart, at ca. 70-degree angle. *Hydathodes* present but indistinct. *Lamina scales* abaxially linear, sclerotic, dark red-brown, ca. 1 mm long, sparse along abaxial costa at maturity, younger leaves with scales scattered on both surfaces. Fertile leaves about equal to or slightly shorter than the sterile, petiole $\frac{1}{2}$ – $\frac{3}{5}$ the leaf length, lamina narrowly elliptic but narrower than the sterile, 11–17 mm broad; intersporangial scales lacking.

TYPE—Peru, Pasco, Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff et al.* 8429 (holotype, UC!; isotype, MO!).

Endemic. Epiphytic in cloud forest, 2300–2500 m, Pasco.

Thus far known only from the type collection.

69. *Elaphoglossum muscosum* (Sw.) Moore, Index fil. 12. 1857.

Acrostichum muscosum Sw., Prodr. 128. 1788. **TYPE:** Jamaica, *Swartz* (holotype, s; isotype, b, *Herb. Willd.* 19523; photo, GH of b).

Stem compact, to 12 mm in diameter, scales linear, reddish orange, to 13 mm long, with short teeth. *Phylloodia* inconspicuous, hidden by scales. Leaves approximate, 11–22 cm long, 2.1–2.5 cm broad. Petiole $\frac{1}{5}$ – $\frac{2}{5}$ the leaf length, scales linear, light orange, erose-denticulate, to 6 mm long, spreading. Lamina narrowly elliptic, subcoriaceous, apex obtuse, base broadly cuneate to rounded. Veins obscure, ca. 1 mm apart, at ca. 60-degree angle. *Hydathodes* lacking. *Lamina scales* of adaxial surface white, or with slightly darker centers, peltate, ovate-lanceolate, long-toothed, abundant, on abaxial surface longer, darker orange, less peltate. Fertile leaves longer than the sterile, petiole ca. $\frac{3}{5}$ the leaf length, lamina slightly narrower than the sterile; intersporangial scales ciliate.

Epiphytic in wet forests, 3000 m, Huancavelica, Cuzco.

Mexico to Panama; West Indies; Colombia to Peru.

This is distinguished by the erose-denticulate scales on the petiole and costa, and the concolorous lamina scales.

Huancavelica: Tayacaja, Ampurco, *Tovar* 3772 (GH). **Cuzco:** Machu Picchu, *Soukup* "177", March 1936 (F).

70. *Elaphoglossum nastukiae* Mickel, sp. nov.

Ab *E. huacsaro* lamina adaxialiter densius squamosa abaxialiter glandulosa et squamulis reductis ciliolatis obsoleta discriminatum.

Named for Ruth Nastuk, who is a volunteer in my office and the New York Botanical Garden greenhouses.

Stem short-creeping, ca. 5 mm in diameter, scales linear-lanceolate, lustrous, black, sclerotic, subentire, 2–3 mm long, with sparse, very short teeth. **Phyllopodia** present. Leaves slightly apart, 18–23 cm long, 1.0–1.5 cm broad. Petiole ca. $\frac{1}{3}$ the sterile leaf length, scales subentire, spreading, 2–3 mm long, dark or orange with dark tip, distally smaller and paler, also with very small, roundish, pale, appressed scales. Lamina narrowly elliptic, chartaceous, apex acuminate, base narrowly cuneate. Veins evident, ca. 0.8 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. Lamina scales adaxially abundant, touching but not much overlapping, ovate or round, entire to erose, 0.5–1.5 mm long; abaxially with reduced, scattered, fimbriate scales and resin dots, costal scales as on petiole. Fertile leaves longer than the sterile, petiole ca. $\frac{2}{3}$ the leaf length, lamina slightly narrower than the sterile; intersporangial scales lacking.

TYPE—Peru, Huancavelica, Tayacaja, quebrada SE of Salcabamba, *Stork & Horton 10312* (holotype, UC!).

Endemic. Terrestrial “in mossy loam under forest cover,” 3300 m, Huancavelica.

Thus far known only from the type.

71. *Elaphoglossum nidiformis* Mickel, sp. nov.

Rhizomate valido squamis aurantiacis induito et fronde sessile ob lanceolato chartacea nuda distincta.

Stem compact, horizontal, ca. 10 mm in diameter, scales ovate-lanceolate, lustrous, orange, 4–6 mm long, subentire with sparse irregular teeth. **Phyllopodia** evident. Leaves fasciculate, 30–37 cm long, 4.0–5.0 cm broad. Petiole essentially lacking, to 1 cm long, with orange, appressed to spreading scales, 4–5 mm long, subentire. Lamina ob lanceolate, chartaceous, apex acute, base narrowly cuneate. Veins evident, about 1.5 mm apart, at 70-degree angle. **Hydathodes** lacking. Lamina scales lacking, but abaxial surface with scattered, minute, stellate trichomidia. Fertile leaves longer than the

sterile, petiole $\frac{1}{2}$ the fertile leaf length, lamina narrowly ob lanceolate; intersporangial scales lacking.

TYPE—Peru, Madre de Dios, Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *Foster 10891* (holotype, Fl!).

Endemic. Epiphytic in wet forests, 700–1000 m, Madre de Dios.

Thus far known only from the type.

72. *Elaphoglossum nigrescens* (Hooker) Diels, Nat. Pflanzenfam. 1(4): 332. 1899.

Acrostichum nigrescens Hooker, Sp. fil. 5: 214. 1864.

TYPE: Venezuela (as British Guiana), Roraima, Schomburgk (holotype, k!).

Stem short-creeping, 1–2 mm in diameter, scales lacking, stem glutinous. **Phyllopodia** present, short, ca. 5 mm long. Leaves approximate, 19–40 cm long, 1.1–2.0 cm broad. Petiole $\frac{1}{30}$ – $\frac{1}{5}$ the sterile leaf length, glabrous. Lamina linear-elliptic, membranous to chartaceous, apex acute to acuminate, base attenuate. Veins evident, free, 1.5–2 mm apart, occasionally elongate laterally at tips but not joining, at ca. 60 degree angle. **Hydathodes** lacking. Lamina scales essentially lacking except on costa and margin, surface glandular-punctate abaxially, costa scales occasional, ovate, brown, under 1 mm long, margin scales occasional, dissected, brown, under 1 mm long. Fertile leaves about equal to the sterile in length, petiole $\frac{2}{3}$ the leaf length, lamina linear, 3–5 mm broad; intersporangial scales lacking.

Epiphytic in wet forests, 100–1200 m, Loreto, Junín, Madre de Dios.

Venezuela; Colombia; Ecuador; Peru.

Loreto: Prov. Maynas, Dist. Napo, bank of Río Santa María, *King 452* (F, NY). **Junín:** Satipo, Gran Pajonal, trail to Pajonal Panquerete, S of Chequitavo, *D. Smith 5133* (NY, UC). **Madre de Dios:** Manú, Cerro de Pantiacolla, *Foster 10792* (F, GH).

73. *Elaphoglossum nivosum* (Kunze) Mickel, comb. nov.

Acrostichum nivosum Kunze, Bot. Zeit. (Berlin) 1845: 281. TYPE: Venezuela, Caracas, *Moritz* (holotype, LZ, destroyed).

Stem compact, 4–8 mm in diameter, scales linear-lanceolate, lustrous, sclerotic, black, ca. 5 mm

long, entire. **Phyllopodia** inconspicuous. Leaves fasciculate (7–)17–30 cm long, 1.2–2.2 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the leaflength, scales with dark center, pale margin, dense, imbricate, ascending, 2–3 mm long, erose. **Lamina** narrowly elliptic, chartaceous, apex acute to obtuse, base cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially densely imbricate, reddish-orange, erose to short ciliodenticulate, 2–3 mm long, costal scales dark, sclerotic centered, adaxially white, round to ovate, peltate, scattered. **Fertile leaves** longer than the sterile, petiole $\frac{3}{5}$ the fertile leaf length, lamina narrow, ca. 1.2 cm broad, costal scales black-centered, cilia longer than the scale body width; intersporangial scales lacking.

Terrestrial on rocky slopes and clay banks, 2600–3900 m, Cajamarca, La Libertad, Ayacucho, Junín.

Venezuela; Ecuador; Peru; Bolivia.

Cajamarca: Prov. Cajamarca, Cerro Tunazorco, Sunchubamba, Cabanillas et al., 26 Aug 1974 (us). Contumazá, La Herilla Gumango, Sagástegui et al. 6461 (NY) 9676 (uc). **La Libertad:** Santiago de Chuco, Cachicadán, Stork & Horton 9951 (f, us). Bolívar, Chomparen, López & Sagástegui 3203 (GH). **Ayacucho:** Ccarapapa, between Huanta & Río Apurímac, Killip & Smith 22284 (NY). **Junín:** Tarma, Palca, 2 km beyond Yanamayo, Tarma to La Merced road, Saunders 707 (f, GH). Paucartambo, Woytkowski 6688 (us), 6690 (us).

74. **Elaphoglossum obovatum** Mickel, Brittonia 39: 322. 1987. TYPE: Venezuela, Amazonas, Cerro Yapacana, Steyermark & Bunting 103199 (holotype, us!; isotype, NY!).

Stem compact, 3–4 mm in diameter, scales linear, orange, lustrous, 3–4 mm long, margin entire or with a few long hairlike processes. **Phyllopodia** present. Leaves fasciculate, 6–11 cm long, 2–4 cm broad. **Petiole** $\frac{1}{5}$ – $\frac{1}{3}$ the sterile leaflength, the scales scattered, appressed to spreading, linear, deeply lacerate, orange to brown, lustrous, 2–4 mm long. **Lamina** obovate, coriaceous, apex broadly rounded, base cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially scattered, concentrated at margin, skeletonized, orange to brown, dull, ca. 2 mm long, adaxially subglabrous. **Fertile leaves** shorter (about $\frac{1}{5}$) than the sterile, petiole about $\frac{1}{2}$ the fertile leaf length, the lamina ovate, apex obtuse, base

rounded, narrower than the sterile lamina; intersporangial scales lacking.

Epiphytic in wet forests, 130–140 m, Loreto. Venezuela; Peru.

The fertile leaf in the only fertile Peru specimen (*Rimachi* 7613) is slightly different from that of the Venezuelan material; it is ovate with rounded base rather than cuneate.

Loreto: Maynas, Dist. Iquitos, Carretera de Santo Tomás, *Rimachi* Y. 7613 (NY). Prov. Requena, Jenaro Herrera, *van der Werff* et al. 10029 (uc). Prov. Maynas, Mishana, *van der Werff* 10177 (uc).

75. **Elaphoglossum obtusum** Mickel, sp. nov.

Ab *E. ornatum* laminae costa ac margine squamis denticulatis provisus recognita.

Stem compact, horizontal, ca. 4 mm in diameter, scales linear-lanceolate, lustrous, orange, 4–7 mm long, with hairlike teeth. **Phyllopodia** ca. 4 mm long, but not dark. Leaves fasciculate, 15–23 cm long, 3.2–5.5 cm broad. **Petiole** $\frac{1}{8}$ – $\frac{1}{6}$ the sterile leaf length, with orange scales widely spreading, 3–7 mm long, 1–1.8 mm broad, with long, hairlike teeth. **Lamina** oblanceolate, chartaceous, apex broadly obtuse, base nearly to broadly cuneate. **Veins** evident, free, 1–1.5 mm apart, ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** as on petiole but narrower, on lower surface limited to costa and margin, remaining surface completely naked, upper surface with scales scattered. **Fertile leaves** about equal the sterile in length, petiole $\frac{2}{5}$ the leaf length, lamina much narrower, ca. 1.3 cm broad, narrowly elliptic, apex obtuse, base cuneate; intersporangial scales lacking.

TYPE—Peru, San Martín, Palo Blanco, al oeste del Puente, Mariscal Cáceres, Tocache Nuevo, *J. Schunke* V. 5757 (holotype, NY!; isotype, F!).

Endemic. Epiphytic in wet forests, 700–800 m, San Martín.

This resembles Venezuelan material cited as *E. ornatum* (Kuhn) Christ (Smith, p. 99) in the dentate scales on costa and margin, the remaining lamina naked, and the oblanceolate lamina. However, the Venezuelan plant narrows to an acute apex rather than being broadly obtuse. The cited Venezuelan material is probably not *E. ornatum*, which differs, according to the original description, in the size and form of the lamina and the laminar scales.

76. *Elaphoglossum oculatum* Mickel, sp. nov.

Ab affini *E. muscoso* lamina utraque facie nuda, costa abaxialiter squamis parvis rotundis albis nigro-oculatis ciliolatis induita, laminaeque margine squamis imbricatis dentatis albis ciliata praestans.

Stem compact, ca. 5 mm in diameter, scales linear-lanceolate, maroon to black, 5–8 mm long, toothed. **Phylloodia** present, hidden under scales. **Leaves** approximate, 18–31 cm long, 1.8–3.9 cm broad. **Petiole** $\frac{1}{4}$ – $\frac{2}{5}$ the sterile leaf length, with scales ovate-lanceolate, erose-denticulate, 2–3 mm long, black or dark orange with white margin, smaller scales appressed. **Veins** evident, 1 mm apart, at 65–70-degree angle. **Hydathodes** lacking. **Lamina scales** lacking on surface abaxially, with marginal scales cilio-denticulate, ca. 1 mm long, adaxial surface glabrous or with greatly reduced scales or nearly substellate trichomes, costal scales round, black with white margins, cilio-denticulate, 0.5–1 mm long. **Fertile leaves** longer than the sterile, petiole about $\frac{1}{2}$ the leaf length, lamina slightly narrower than the sterile; intersporangial scales abundant, ciliate.

TYPE—Peru, Piura, Huancabamba, above Huancabamba, road to Canchaque, *Hutchison* 1629 (holotype, UC!; isotype, GH!).

Endemic. Epiphytic in wet forests, 1900–3100 m, Piura, Junín, Cuzco.

Junín: Tarma, Agua Dulce, *Wojtkowski* 35433 (MO, UC). **Cuzco**: Machu Picchu, Soukup “176”, March 1936 (F).

77. *Elaphoglossum odontolepis* Mickel, sp. nov.

Rhizomate longe repenti laminaque coriacea secus costam squamis obscuris hinc inde dentatis provisa praestans.

Stem long-creeping, ca. 3 mm in diameter, scales linear-lanceolate, lustrous, orange to black-brown, 3–5 mm long, hastate, with occasional hairlike processes. **Phylloodia** present. **Leaves** 1–3 cm apart, 32–50 cm long, 3.4–5.5 cm broad. **Petiole** ca. $\frac{1}{5}$ the sterile leaf length, glabrous. **Lamina** narrowly oblanceolate to narrowly lanceolate, coriaceous, apex acuminate, base attenuate. **Veins** obscure, free, 1 mm apart, at ca. 80-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially scattered, especially near lamina base and along costa, 2–3 mm long, hastate, black, with irregular pro-

cesses, and with black punctae, also adaxially black-punctate and stellate-punctate. **Fertile leaves** nearly equaling the sterile in length, petiole about $\frac{1}{3}$ the leaf length, lamina nearly equal to the sterile in size and shape; intersporangial scales scattered, black, sclerotic, with irregular teeth.

TYPE—Peru, Cuzco, Urubamba, Machu Picchu, E of Phuyupatamarca overlooking Urubamba River and Winay Huayna, *Peyton & Peyton* 356 (holotype, MO!).

Endemic. Epiphytic in wet forests, 3200–4000 m, San Martín, Cuzco.

San Martín: Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, Chochos, forest on edge of Laguna de Chochos, *Young & León* 4866 (USM). **Cuzco**: La Convención, Huayopata 7 km from Incatambo, S side of Lucumayo River, *Peyton & Peyton* 958 (GH). 8 km SE of Machu Picchu, Whiteman, Aug 1980 (NY).

78. *Elaphoglossum oophyllum* Mickel, sp. nov.

Rhizoma longe repens et lamina magna ovato-lanceolata squamis minutis nigris conspersa diagnoscenda.

Stem long creeping, ca. 3 mm in diameter, scales linear-lanceolate, dull orange-tan, 3–4 mm long, with hairlike processes. **Phylloodia** present. **Leaves** 5–10 mm apart, 23–32 cm long, 5.5–6.6 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, scales black, linear-lanceolate, appressed to spreading, 2–4 mm long, with irregular hairlike processes. **Lamina** ovate to ovate-lanceolate, chartaceous, apex acute, base rounded. **Veins** obscure, free, 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially reduced to orange stellate trichomidia, along costa scales black, linear-lanceolate, with irregular hairlike processes, adaxially glabrous. **Fertile leaves** longer than the sterile, petiole $\frac{2}{3}$ – $\frac{3}{4}$ the fertile leaf length, lamina narrowly elliptic; intersporangial scales lacking.

TYPE—Peru, Cuzco, La Convención, Ichiquiato, *Vargas* C. 22337 (holotype, GH!; isotype, GH!).

Endemic. Epiphytic(?) in wet forests, 1000 m, Cuzco.

Thus far known only from the type collection.

79. *Elaphoglossum orbignyanum* (Fée) Moore, Index fil. xvi. 1857.

Acrostichum orbignyanum Fée, Mém. foug. 2: 56. t. 13, f. 2. 1845. TYPE: Bolivia, Yungas, Chupe, Marancel del Monte, *Orbigny* 138 (holotype, pl!).

Stem compact, 6–12 mm in diameter, scales lanceolate-deltate, black, very indurated, lustrous, ca. 5 mm long, with weak, tan cilia along margin. **Phylloodia** present but hidden by scales. **Leaves** approximate, (30–)75–100 cm long, 4–7 cm broad. **Petiole** about $\frac{1}{2}$ the leaf length, scales dense, appressed to ascending, lanceolate to linear-lanceolate, ciliate, orange, some red-centered, to 7 mm long at petiole base, but mostly 2–3 mm long. **Lamina** elliptic, chartaceous, apex gradually to abruptly acuminate, base broadly cuneate. **Veins** ca. 1 mm apart, at 80-degree angle, obscured by scales. **Hydathodes** lacking. **Lamina scales** adaxially barely touching one another, lanceolate to ovate-lanceolate, 1–3 mm long, orange, ciliate, abaxially densely imbricate, ciliate, orange, often red-centered, 1–3 mm long, costal scales lanceolate to linear-lanceolate, 2–4 mm long, red-centered, appressed. **Fertile leaves** nearly equalling the sterile in length, petiole $\frac{3}{5}$ the leaf length, lamina elliptic, narrower than the sterile; intersporangial scales lacking.

Terrestrial in wet forests, (680–)1350–3200 m, San Martín, Junín, Cuzco.

Venezuela; Colombia; Peru; Bolivia.

This differs from *E. hickenii* in that the latter has stem scales nonciliate, petiole and costal scales erose to short-ciliate, and lamina narrower (2.5–4.1 cm).

San Martín: San Roque, *Ll. Williams* 7418 (us). Junín: Colonia Perené, *Killip & Smith* 24954 (ny, uc, us). Carapata, above Huacapistana, *Killip & Smith* 24413 (ny). Chanchamayo Valley, *C. Schunke* 134, 135 (us). Tarma, Agua Dulce, *Wojtkowski* 35438 (mo, uc). Cuzco: Machu Picchu, *Coronado* 141 (uc). Prov. Cuzco, Ribera del Río Urubamba, *Angulo* 1773 (gh). Machu Picchu, *Soukup* "175" (f). San Miguel, Urubamba Valley, *Cook & Gilbert* 1159 (us).

80. *Elaphoglossum oxyglossum* Mickel, sp. nov.

Ab *E. zebrino*, cui arcte affinis, rhizome compacto et laminae squamis brevioribus abstat.

Stem short-creeping, ca. 3 mm in diameter, with white patches on stem and petiole bases, scales lanceolate, maroon-black, lustrous, 0.5–1 mm long, entire. **Phylloodia** lacking. **Leaves** to ca. 2 mm

apart, 55–65 cm long, 2.0–2.5 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, with sparse linear-lanceolate, appressed, blackish scales ca. 1 mm long. **Lamina** linear-elliptic, chartaceous, apex acuminate, base cuneate. **Veins** evident, ca. 1.5 mm apart, at 60–70-degree angle. **Hydathodes** distinct. **Lamina scales** lacking adaxially except for sparse, tan ones 1.5 mm long, along margin near hydathodes, abaxially sparse, small, lanceolate, dark to pale, 0.5–1 mm long on costa and lamina. **Fertile leaves** slightly shorter than the sterile, petiole $\frac{3}{4}$ the fertile leaf length, lamina apex acute, base cuneate, scales 1–1.5 mm long, maroon on costa; intersporangial scales pale.

TYPE—Peru, Pasco, Oxapampa, road from Oxapampa to Villa Rica, *Skog et al.* 5099 (holotype, us!).

Endemic. Epiphytic in wet forest, ca. 1500–2150(–3400) m, San Martín, Huánuco, Pasco.

San Martín: Mariscal Cáceres, *Young* 3783 (usm). Huánuco: Huacachi, near Muña, *Macbride* 4129 (f, us). Muña, *Bryan* 538 (f). Cushi, *Macbride* 4818 (f, us).

81. *Elaphoglossum pachyphyllum* (Kunze) C. Chr., Index fil. 312. 1905.

Acrostichum pachyphyllum Kunze, Linnaea 9: 26. 1834. **TYPE**: Peru, Pampayacu, *Poeppig*, July 1829 (holotype, lz, destroyed; isotype, pl; photos, f!, ny!).

Hymenodium kunzeanum Fée, Mém. foug. 2: 90, t. 58. 1845, based on *Acrostichum pachyphyllum* Kunze and with the same type.

Stem short-creeping, (3) 6–10 mm in diameter, scales linear-lanceolate, dull brown, 10–20 mm long, with hairlike processes. **Phylloodia** present. **Leaves** 1–2.5 cm distant, 50–100 cm long, 0.9–1.5 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the leaf length, scales at base scattered, orange, spreading, 5–10 mm long, with hairlike processes, scales distally reduced, obscure, finely skeletonized, appressed. **Lamina** broadly lanceolate, coriaceous, apex acute to acuminate, base truncate to broadly cuneate. **Veins** barely visible, anastomosing, 1 mm apart, at 80-degree angle. **Hydathodes** lacking. **Lamina scales** lacking except for finely skeletonized, orange appressed ones along costa. **Fertile leaves** shorter than the sterile, petiole $\frac{1}{2}$ the leaf length, the lamina similar in shape to the sterile; intersporangial scales lacking.

Endemic. Epiphytic in wet forests, 680–2700 m, Amazonas, San Martín, Huánuco, Junín, Cuzco, Madre de Dios.

Amazonas: 12–18 km E of La Peca in Serranía de Bagua, Gentry et al. 22886 (MO). **San Martín:** Mariscal Cáceres, Río Abiseo Nat. Park, Young & León 5021 (USM). **Huánuco:** Pampayacu, Kanehira 126 (GH). **Junín:** Chanchamayo Valley, C. Schunke 175 (F). La Merced, Hacienda Schunke, Macbride 5773 (F). Colonia Perené, Killip & Smith 24952 (F, GH, NY, US). **Cuzco:** Prov. Paucartambo, Valle de Pillahuata, Herrera 1615 (US). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palota 10–15 km NNW of Shintuya, Foster 10889A (F, GH).

82. *Elaphoglossum pachyrrhizum* Mickel, sp. nov.

Rhizomate valido longe repenti, lamina linearis obscure venosa necnon laminae squamis lanceolatis badiis ab affinibus remota.

Stem long-creeping, to 4 mm in diameter, scales tan, lanceolate, 3–5 mm long, entire. **Phylloodia** lacking. Leaves distant, 18–30 cm long, 1.3–1.7 cm broad. Petiole $\frac{1}{4}$ – $\frac{1}{3}$ the leaf length, scales imbricate, lanceolate, tan to brown, 1–2 mm long, entire, appressed to somewhat spreading. **Lamina** linear-elliptic, apex acuminate, base cuneate. Veins indistinct, free, 1–2 mm apart, at 50–70-degree angle. **Hydathodes** evident. **Lamina scales** brown, lustrous, lanceolate, 1–2 mm long, mostly along costa, deciduous on abaxial surface but with minute punctae or stellate trichomidia, those of the margin entire, ca. 1 mm long, mostly appressed. **Fertile leaves** shorter than the sterile, petiole about $\frac{2}{3}$ the fertile leaf length, lamina apex acute, base subtruncate or rounded; intersporangial scales lacking.

TYPE—Peru, Amazonas, Bagua, Cordillera Colón, SE of La Peca, Barbour 4111 (holotype, MO).

Endemic. Terrestrial in wet forests, 2350–2450 m, Amazonas.

Thus far known only from the type.

83. *Elaphoglossum paleaceum* (Hooker & Grev.) Sledge, Bull. Brit. Mus. (Nat. Hist.) Bot. 4(2): 95. 1967. Figure 25a–b.

Acrostichum paleaceum Hooker & Grev., Icon. fil. 2: t. 235, Alph. Index et Syst. Index. 1831. TYPE: the original figure, drawn from Madeira, Lowe (not located).

Acrostichum vestitum Hooker & Grev., Icon. fil. 2: text for t. 235. 1831, not Schlecht. & Cham. 1830.

Stem compact, horizontal, 2–6 mm in diameter, scales linear-lanceolate, brown to black and opaque, lustrous, ca. 5 mm long, margin with long, stiff, hairlike teeth. **Phylloodia** distinct. Leaves approximate, 10–28 cm long, 0.8–1.6 cm broad. Petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, densely to sparsely clothed with spreading, black or orange scales, these often with black teeth and tip, to 3 mm long. **Lamina** narrowly elliptic, apex acuminate, base broadly to narrowly cuneate. Veins obscure, free, ca. 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abundant, overlapping but loose, lanceolate, ca. 2 mm long, long hair-toothed, usually those of the petiole and costa dark. **Fertile leaves** shorter than the sterile, to 20 cm long, petiole $\frac{1}{2}$ – $\frac{2}{3}$ the fertile leaf length, but with same lamina shape or more obtuse; intersporangial scales lacking.

Epiphytic and terrestrial on rocky banks in wet forests, 950–3950 m, Piura to Amazonas, south to Cuzco and Puno.

Mexico to Panama; West Indies; Venezuela and Colombia to Bolivia and Brazil; Azores and Madeira.

There is considerable variation in this species, and I take a rather broad view of it here. Most of the specimens agree with the measurements cited above. These may match *E. plicatum* (Cav.) C. Chr., in which case that is the correct name, but closer study is needed. Plants with larger, broader leaves (26–61 cm long, 2.4–4.1 cm broad), often with a caudate apex (examples cited below with asterisk), may be *E. molle* (Sodiro) C. Chr. (Type from Ecuador; isotype, s!).

Piura: Huancabamba, above Canchaque on the road to Huancabamba, Hutchison 1648 (GH). **Cajamarca:** Colosay, Woytkowski 7020 (MO). Hualgayoc, Soukup-Carmona Fa5234* (US). **Amazonas:** Chachapoyas, Cerros Calla Calla, 19 km above Leimebamba on road to Balsas, Hutchison & Wright 5571 (F, GH, NY, UC, US). **San Martín:** Mariscal Cáceres, Chochos, NW corner Río Abiseo Nat. Park, Young 3592* (NY). Rioja, Pedro Ruiz-Moyobamba road, D. Smith 4355* (UC). **Huánuco:** Río Llullapichis watershed on the ascent of Cerros del Sira, Dudley 13340A* (GH). Tambo de Vaca, Bryan 649* (F, GH). Muña, Macbride 4301* (US). **Pasco:** Oxapampa, Abra los Mellizos, Skog et al. 5046a (US). **Cuzco:** Urubamba, ruins of Machu Picchu, Tryon & Tryon 5397 (GH). Cordillera Vilcabamba, 28 km NE of Hda. Luisiana and Apurímac River, Dudley 11188 (US). Montana de Colca, Valle de Lares, Bues 1794 (US). **Puno:** Carabaya, valle de San Gabán, Hda. Quillabamba a Pte. Arica, Vargas C. 18918* (GH).

84. **Elaphoglossum palorense** Rosenst., Repert. Spec. Nov. Regni Veg. 7: 149. 1909. TYPE: Ecuador, Cordillera oriental ad flumen Palora, Rimbach 66 (holotype, s!).

Stem short-creeping, ca. 4 mm in diameter, scales linear-lanceolate, lustrous, castaneous, 2–3 mm long, entire. **Phylloodia** lacking. **Leaves** approximate to only slightly apart, (15–)35–42 cm long, 0.8–1.1 cm broad. **Petiole** ca. $\frac{1}{10}$ the leaf length, scales linear, orange-tan, 2–3 mm long, ca. 0.4 mm broad, patent. **Lamina** linear, chartaceous, apex acuminate, base long-attenuate, margin entire to barely crenulate. **Veins** evident, 1.5–2 mm apart, at ca. 65-degree angle. **Hydathodes** present but indistinct. **Lamina scales** linear, orange-tan, scattered on abaxial costa, to 1 mm long, very sparse on abaxial surface and margin, to 0.5 mm long. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{4}$ the leaf length, lamina narrowly elliptic, apex apiculate, base broadly cuneate, 0.9–1.1 cm broad; intersporangial scales lacking.

Epiphytic in wet forests, 1450–1800 m, San Martín, Huánuco.

Ecuador; Peru.

Similar to *E. eximium* except: petiole and lamina scales not subulate and dark, but tan-orange, linear, not punctate abaxially; fertile leaf more narrowly elliptic, the lamina 6–7.5 cm long, 0.9–1.1 cm broad, and with cuneate base.

San Martín: Rioja, Venceremos, D. Smith 4434 (F).
Huánuco: SW slope of Río LLullapichis watershed on the ascent of Cerros del Sira, Dudley 13198 (GH).

85. **Elaphoglossum papillosum** (Baker) Christ, Monogr. Elaphoglossum. 130. 1899.

Acrostichum papillosum Baker. J. Bot. 15: 167. 1877.
TYPE: Ecuador, Andes of Quito, Sodiro (holotype, κ).

Stem short-creeping, 4 mm in diameter, scales black, lanceolate-deltate, 1–2 mm long. **Phylloodia** lacking. **Leaves** approximate, 34–38 cm long, 5.2–5.7 cm broad. **Petiole** $\frac{1}{3}$ the sterile leaf length, scales scattered, appressed, black-brown, lanceolate, to 1 mm long. **Lamina** elliptic, chartaceous, apex acuminate, base cuneate. **Veins** distinct, free, ca. 1.5 mm apart, at ca. 70-degree angle. **Hydathodes** evident. **Lamina scales** on both surfaces brown-black, lanceolate, 0.5 mm long, scattered adaxially, sparse abaxially. **Fertile leaves** longer,

lamina oblanceolate, apex acute, base attenuate, petiole $\frac{3}{5}$ the fertile leaf length; intersporangial scales lacking.

Epiphytic or terrestrial in wet forests, 2650–2750 m, San Martín.

Costa Rica; Panama; Venezuela and Colombia to Bolivia.

Similar to *E. castaneum* except: petiole of fertile leaf gray-green (dried), similar to those of sterile leaves, not black; laminar scales and petiole scales short, lanceolate, dark, not subulate and toothed; stem scales black, not castaneous.

San Martín: Prov. Mariscal Cáceres, Río Abiseo Nat. Park, Young & León 5007 (USM).

86. **Elaphoglossum pascoense** R. Tryon. Amer. Fern J. 74: 108. 1984. TYPE: Peru, Oxapampa, road between Oxapampa and Villa Rica, Foster 9127 (holotype, GH; isotypes, MO!, NY!).

Stem long-creeping, 5–7 mm in diameter, scales dark, appressed, resinous, dark brown, entire, 1–2 mm long, sparse except at apex. **Phylloodia** lacking. **Leaves** 28–54 cm long, 6.5–12 cm broad. **Petioles** distant, long-decurrent on the stem, $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, scales abundant, appressed, tan, ovate to linear-lanceolate, finely ciliolate. **Lamina** oblong-ovate, apex caudate, base deeply cordate to sagittate. **Veins** distinct, free, ca. 2 mm apart, at 75–80-degree angle. **Hydathodes** evident. **Lamina scales** sparse, lanceolate, light brown, denticulate, but broader, more dense, minutely ciliolate, and appressed on costa. **Fertile leaves** equalling the sterile in length, petiole $\frac{3}{4}$ the fertile leaf length, lamina lanceolate, 12 cm long, 2 cm broad, apex acuminate, base truncate; intersporangial scales elongate, brownish, ciliate.

Endemic. Terrestrial in wet forests, 2100–2400 m, Pasco.

Thus far known only from the type collection.

87. **Elaphoglossum patinii** (Baker) Christ, Monogr. Elaphoglossum 58. 1899.

Acrostichum patinii Baker, in Hooker & Baker, Syn. fil. ed. 2: 519. 1874.

SYNTYPES: Andes of New Granada, Patin (κ); Peru, Cuzco, Pintobamba, Pearce (BM; photo, us).

Stem short-creeping, 2–3 mm in diameter, scales tan-orange, linear-lanceolate, spreading, dull, 6–8 mm long, 1–1.5 mm wide, entire. **Phyllopodia** present, hidden among scales. **Leaves** 1–1.5 cm apart, 25–28 cm long, 1.7–2.0 cm broad. **Petiole** $\frac{1}{5}$ – $\frac{1}{10}$ the leaf length, glabrous. **Lamina** linear-elliptic, coriaceous, apex narrowly obtuse, base narrowly cuneate. **Lamina scales** abaxially sparse, black, sclerotic, hastate, ca. 1 mm long, adaxially lacking. **Fertile leaves** shorter than the sterile, petiole $\frac{1}{5}$ the leaf length, lamina broader than the sterile, 2.0–2.4 cm broad, apex narrowly obtuse, base rounded; intersporangial scales lacking.

Epiphytic in wet forests, elevation unknown, Cuzco.

Colombia; Peru.

Possibly distinct from the Colombian syntype, in which case the Patin collection should be designated the lectotype and the Peru specimen renamed. It resembles *E. velongum* in the linear, coriaceous, glabrous lamina and orange stem scales, but *E. patinii* has longer, more spreading stem scales, more slender petiole, and lacks petiole scales.

88. ***Elaphoglossum petiolosum* (Desv.) Moore**, Index fil. 12. 1857.

Acrostichum petiolosum Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5: 309. 1811. TYPE: Peru, *J. de Jussieu* (holotype, P!).

Acrostichum acuminatum Poir. in Lam., Encycl. Suppl. 1: 120, Sept. 1810, (not Willd. 1810). TYPE: Peru, *J. de Jussieu* (holotype, P).

Acrostichum caudatum Hooker, Icon. pl. t. 215. 1840, not Cav. 1802. TYPE: Colombia, Andes, Pilz-hum, Jameson (holotype, K!).

Elaphoglossum caudatum (Hooker) Moore, Index fil. 7. 1857.

Elaphoglossum glutinosum Christ. Monogr. Elaphoglossum 120. 1899. TYPE: Andes of Quito, Ecuador, Spruce 5614 (isotype, B!).

Stem short-creeping, 3–4 mm in diameter, scales linear, lustrous, red-black, 6–10 mm long, entire or with very sparse teeth (1–2 per scale). **Phyllopodia** distinct. **Leaves** 1–5 mm apart, 15–44 cm long, 1.8–3.0 cm broad. **Petiole** $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, with orange scales appressed to spreading, 2 mm long, with hairlike teeth, also glandular trichomes, especially at base of petiole. **Lamina** lanceolate to elliptic, subcoriaceous, apex long-cuspidate, base rounded to broadly cuneate. **Veins** evident, free, ca 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** lanceolate,

cilio-denticulate, 1 mm long, scattered on adaxial surface, abaxially glabrous except for glandular dots, costa and margin with scales 2 mm long. **Fertile leaves** nearly equalling the sterile in length, petiole $\frac{1}{3}$ the fertile leaf length, lamina similar to sterile in size and shape, shorter-cuspidate, conduplicate; intersporangial scales lacking.

Epiphytic in wet forests, 3050–3950 m, Amazonas, La Libertad, San Martín, Huánuco, (Junín?), Cuzco.

Colombia to Bolivia.

Amazonas: Chachapoyas, Cerros Calla Calla, 26 km above Leimebamba on road to Balsas, *Hutchison & Wright* 6977 (F, GH, NY, UC, US). Prov. Chachapoyas, S side of Molinopampa–Diosan pass, *Wurdack* 1610 (US). **La Libertad:** Pataz, Puerta del Monte, Paso La Sábana, *López & Sagástegui* 3465 (GH). **San Martín:** Mariscal Cáceres, forest patch above timberline, Puerta del Monte, *Young* 1619 (NY). Mariscal Cáceres, N side of Chochos Valley, NW corner of Río Abiseo Nat. Park, *Young* 3660 (USM). Mariscal Cáceres, small forest patch above timberline, Chochos, *Young* 2281 (NY). Mariscal Cáceres, Puerta del Monte, NW corner of Río Abiseo Nat. Park, *Young & Leon* 4918 (USM). Dist. Huallaga, Valley of Río Apisoncho above Jucusbamba, *Hamilton & Holligan* 504, 300 (K). **Huánuco:** Tambo de Vaca, *Bryan* 653 (F, US). **Cuzco:** Lucumayo Valley, *Cook & Gilbert* 1343 (US). **Department unknown** (probably Junín): Between Arma (Tarma?) & Yanama (Yanano?), *Bingham* 2060 (US).

89. ***Elaphoglossum piloselloides* (Presl)** Moore, Index fil. 13. 1857. **Figure 25d–e.**

Acrostichum piloselloides Presl. Reliq. haenk. 1: 14, t. 2, f. 1. 1825. TYPE: Hab. in montanis Peruviae, *Haenke* (holotype, PR or PRC).

Stem erect or ascending, ca. 2 mm in diameter, scales linear, orange, entire, 3–6 mm long. **Phyllopodia** lacking. **Leaves** fasciculate, 2–4 (8) cm long, 0.4–1.0 cm broad. **Petiole** slender, usually $\frac{1}{3}$ – $\frac{3}{4}$ the sterile leaf length, moderately clothed with tan to orange, very narrow, subulate scales 2–4 mm long. **Lamina** spatulate, obovate-lanceolate to narrowly elliptic, apex obtuse, base broadly cuneate. **Veins** obscure, free, ca. 1 mm apart, at 40–50-degree angle. **Hydathodes** present but inconspicuous. **Lamina scales** somewhat subulate (slightly rolled at base) tan to dull orange, uniformly and moderately covering the lamina surfaces. **Fertile leaves** equal to or longer than the sterile, more erect, petiole ca. $\frac{1}{5}$ the fertile leaf length, lamina smaller than the sterile, often folded in half, spatulate to nearly round, scales of lamina and upper

petiole dark brown to black, lustrous, scale bases not inrolled but spreading and denticulate; intersporangial scales lacking.

Terrestrial or epipetric, on rock cliffs, open woods, clay banks, dripping cliffs, 750–2600 m, Piura to Cajamarca, south to Huancavelica and Cuzco.

Mexico to Panama; West Indies; Suriname; Venezuela; Colombia to Chile.

This differs slightly from *E. spatulatum* (Bory) Moore of Bourbon Island and Africa and often is placed under that name.

Piura: Huancabamba, just below summit of Abra Porculla Pass, Mesones-Muro Hwy., Hutchison 1385 (uc, us). **Lambayeque:** 46 km from Olmos on road to Jaén, Correll & Smith P823 (us). **Cajamarca:** Jaén, Granadillas, in Quebrada Granadillas above Tabaconas, 18 km SE Huancabamba, Fosberg 27832 (us). **La Libertad:** Otuzco, Huaranchal, López et al. 2692 (GH). **Huánuco:** Mito, steep banks on NW slopes, Macbride 3281 (F, us). **Pasco:** Oxapampa, Palcazú, Foster 10230 (F). **Junín:** Tarma, La Merced road, 46 km from Tarma, D. Smith & Canne 5942 (F, uc). **Huancavelica:** Tayacaja, near Salcabamba, Tovar 3592 (GH, usm). **Ayacucho:** Ccarapá, between Huanta & Río Apurímac, Killip & Smith 22431 (NY, us). **Cuzco:** San Miguel, Urubamba Valley, Cook & Gilbert 1181 (us).

90. ***Elaphoglossum pilosius* Mickel, Brittonia 39: 324. 1987.** TYPE: Venezuela, Mérida, trail leading from La Negrita to the Boquerón of the Quebrada de las Canas, Luteyn 6139 (holotype, NY!).

Stem compact, ca. 4 mm in diameter, scales linear-lanceolate, dark reddish-brown, lustrous, 6–8 mm long, denticulate. **Phylloodia** lacking. Leaves fasciculate, (6)9–16 cm long, 1.4–2.7 cm broad. Petiole $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, with scales patent, subulate, reddish-brown, lustrous, 2–3 mm long, denticulate, mixed with minute glandular trichomes. **Lamina** lanceolate to ovate-lanceolate or deltate-lanceolate, chartaceous, apex cuspidate, base rounded or truncate. Veins evident, free, 1 mm apart, at 60–75-degree angle. **Hydathodes** present. **Lamina scales** scattered, subulate, reddish-brown, lustrous, 2–3 mm long on adaxial surface, costa and margin, 1–1.5 mm long on abaxial surface. **Fertile leaves** longer than the sterile, petiole $\frac{3}{4}$ the fertile leaf length, lamina oblong, apex obtuse, base rounded to truncate, often folded along costa (conduplicate), costal scales dense, subulate, but intersporangial scales lacking.

Terrestrial or epipetric on roadbanks and rocky slopes in grassy shrubland, 2900–4000 m, Cajamarca, Ancash.

Costa Rica; Panama; Venezuela; Colombia to Peru.

Elaphoglossum pilosius appears to be distinct from *E. lindenii* on the basis of its greater pubescence and rounded to truncate lamina base, but more extensive population samples are needed to settle the matter.

Cajamarca: San Miguel, El Tingo, Sagástegui 8824 (F). **Ancash:** Yungay, 25 km E of Yungay, Edwin & J. Schunke V. 3810 (F, GH, us). Yungay, Huascarán Nat. Park, Quebrada Ranícuray, D. Smith et al. 10470b (NY).

91. ***Elaphoglossum plumosum* (Fée) Moore, Index fil. 364. 1862.**

Acrostichum plumosum Fée, Mém. foug. 2: 54. t. 20, f. 1. 1845. TYPE: Guyana (as French Guiana), Schomburgk 446 (isotype, BM!).

Stem compact, horizontal, to 10 mm in diameter, scales linear-lanceolate, pale, ca. 5 mm long, margins with long, hairlike teeth. **Phylloodia** distinct. Leaves fasciculate, 16–36 cm long, 2.2–3.7 cm broad. Petiole $\frac{1}{10}$ – $\frac{1}{4}$ the sterile leaf length, densely clothed with spreading orange scales similar to those of the stem but broader, scales to 5 mm long. **Lamina** narrowly elliptic to narrowly oblanceolate, apex acute to obtuse, base acuminate. Veins obscure, free, ca. 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abundant, overlapping, lanceolate, ca. 2–3 mm long, orange, long hair-toothed, completely covering abaxial side of leaf and sporadic to lacking on adaxial side, denser along costa. Fertile leaves about equal the sterile in length, petiole about $\frac{1}{2}$ the fertile leaf length, lamina ca. 2 cm broad, lanceolate, scales along abaxial costa, intersporangial scales lacking.

Epiphytic in wet forests, 120–150 m, Loreto. Guianas; Venezuela; Colombia; Ecuador; Peru; Brazil.

Loreto: Maynas, Río Nanay, Casería Mishana, 30 km SW of Iquitos, Foster 4461 (F). Maynas, Dist. Iquitos, Carretera de Varillal, km 6 de Quista Cocha al caserío de Varillal, Rimachi Y. 7845 (NY). Maynas, Iquitos, road beyond Quista Cocha, McDaniel 13593 (GH). Vic. Iquitos, Revilla 4317 (UC).

92. *Elaphoglossum poeppigianum* (Fée) Moore, Index fil. 13. 1857.

Acrostichum villosum var. *poeppigianum* Fée, Mém. foug. 2: 50, t. 20, f. 2. 1845. TYPE: Peru, ad Pampayacu, *Poeppig* 190 (holotype, P!; isotype, B, UC!).

Acrostichum poeppigianum (Fée) Fée, Gen. fil. 43. 1852.

Stem compact, horizontal, ca. 3 mm in diameter, scales linear, brown, lustrous, 3–5 mm long, entire. **Phylloodia** lacking. **Leaves** fasciculate, 28–37 cm long, 11–16 cm broad. **Petiole** $\frac{1}{4}(\frac{1}{10})$ the sterile leaf length, with scales abundant, orange-brown, widely spreading, subulate, slightly toothed, 2–4 mm long. **Lamina** linear-elliptic, chartaceous, apex acuminate, base cuneate to attenuate. **Veins** distinct, free, 2–3 mm apart, at 60-degree angle. **Hydathodes** evident. **Lamina scales** scattered, reddish orange, subulate, slightly toothed, 1–2 mm long on lamina and margin, 2–3 mm long on costa. **Fertile leaves** about equal the sterile in length, petiole $\frac{3}{4}$ the fertile leaf length, lamina elliptic, apex apiculate, base rounded; intersporangial scales lacking.

Endemic. Terrestrial in wet forests, 2085–2700 m, Huánuco, Pasco, Junín.

The van der Werff specimen most closely resembles the type; the Ellenberg collection differs in having an attenuate lamina base and very short petiole.

Huánuco: Carpish, *Ellenberg* 3930 (GH). Carpish, *Sandeman* 5157a (K). **Pasco:** Prov. Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff* et al. 8450 (MO, UC). **Junín:** La Merced-Chanchamayo, *Soukup* 1017 (F). **Department unknown:** Tocachillo, *Jelski* 1078 (P).

93. *Elaphoglossum propinquum* (Kuhn) Christ, Monogr. *Elaphoglossum*. 115. 1899.

Acrostichum propinquum Kuhn, Linnaea 36: 45. 1869. TYPE: Peru, near Agapata, *Lechler* 2007 (holotype, B!; isotype, P!; photos, F & US of P).

Stem compact, to 8 mm in diameter, scales castaneous, stiff to crispat, to 12 mm long. **Phylloodia** lacking. **Leaves** fasciculate, 15–39 cm long, 2.6–4.5 cm broad. **Petiole** stramineous, $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with scales subulate, spreading, sparse to lacking, petiole also with a few minute, erect, glandular trichomes. **Lamina** narrowly lanceolate, chartaceous to subcoriaceous, apex cau-

date, base broadly cuneate to rounded. **Veins** evident, free, 1.5–2 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** black, subulate, mostly along the margin, generally early deciduous, mature specimens with only a few scales or scales totally lacking, lamina also with minute, stellate trichomidia. **Fertile leaves** shorter than the sterile, petiole ca. $\frac{2}{3}$ the leaf length, lamina the same shape as the sterile but slightly narrower; intersporangial scales lacking.

Endemic. Epiphytic or epipetric in wet forests, 1500–3000 m, Amazonas, Huancavelica, Cuzco, Puno.

Amazonas: Bagua, Cordillera Colón near La Peca, *Barbour* 4175 (MO). **Huancavelica:** Tayacaja, Chuspi, *Tovar* 2036 (GH, USM). **Cuzco:** Calahuala, Machu Picchu, *Cook & Gilbert* 881 (US). Torontoy, *Herrera* 1314 (US).

94. *Elaphoglossum pumilio* Mickel, sp. nov.

Ab *E. tenuiculum* lamina adaxialiter squamis peltatis, abaxialiter squamis stellatis cum nonnullis ovato-resinoso-sclerotico-ciliatis induta diversa.

Stem short-creeping, ca. 2 mm in diameter, scales linear-lanceolate, lustrous, castaneous to dark brown, 2–3 mm long, entire. **Phylloodia** distinct. **Leaves** 1–2 mm apart, (5)11–27 cm long, 0.4–0.6 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{4}{5}$ the sterile leaf length, with castaneous scales ascending to spreading, resinous, 1–2 mm long, with sparse irregular short teeth, the scales mixed with glands and peltate, ciliate, pale scales. **Lamina** linear, chartaceous, apex acuminate to obtuse, base cuneate. **Veins** barely visible, free, ca. 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially reduced to stellate trichomes with a slight scale body, both surfaces with scattered peltate, round to ovate-lanceolate, red-brown, resinous, ciliate scales; costa abaxially with scattered lanceolate lustrous scales. **Fertile leaves** equal to or slightly longer than the sterile in length, petiole $\frac{3}{8}$ – $\frac{1}{2}$ the fertile leaf length, the lamina narrow, 0.3–0.5 cm broad; intersporangial scales lacking.

TYPE—Peru, Huánuco, Yanano, *Macbride* 4943 (holotype, NY!; isotypes, F!, US!).

Endemic. Terrestrial on roadsides and rocky clay banks, 1850–2800 m, Cajamarca, La Libertad, Huánuco, Cuzco.

This resembles small specimens of *E. tenuiculum* but apparently it lacks strictly stellate tri-

chomes, having round, peltate, ciliate scales that can appear as such.

Cajamarca: Contumazá, alrededores de Guzmango, *Sagástegui* 9044 (HUT, MO). Contumazá, Contumazá-Cascas, *Sagástegui et al.* 6503 (GH). Contumazá, Bosque de Cachil (Cascas-Contumazá), *López et al.* 9063 (GH, us). Prov. Cajamarca, La Posada, (Las Quinuas-Huatum), *Sagástegui* 10134 (MO, UC). **Cuzco:** Hacienda Ayasbamba, *Vargas* 365a (GH).

95. *Elaphoglossum punae* Mickel, sp. nov.

Ab *E. tenui* stiptis squamis imbricatis, lamina latiori, laminaeque squamis ovatis basi-glandulosis segreganda.

Stem long-creeping, ca. 2 mm in diameter, scales linear, lustrous, dark red-brown, ca. 3 mm long, minutely denticulate, recurved. **Phylloodia** present. Leaves 1–2.5 cm apart, 10–32 cm long, 1.1–1.6 cm broad. Petiole $\frac{1}{2}$ – $\frac{3}{5}$ the leaf length, scales to 3 mm long at petiole base, distally ca. 1 mm long, longer ones linear-lanceolate and spreading, shorter ones lanceolate, appressed, brown, entire. **Lamina** narrowly elliptic, chartaceous, apex long-acuminate, base cuneate. **Veins** obscure, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** ovate-deltate, to 1.3 mm adaxially; abaxially 0.5–0.8 mm long, scattered, with conspicuous, glandular dots. **Fertile leaves** unknown.

TYPE—Peru, Ayacucho, La Mar, Cordillera Central between Tambo San Miguel, Ayna & Hacienda Luisiana, *Dudley* 12031 (holotype, us!; isotype, GH!).

Endemic. Terrestrial in grassland above timberline on exposed summit ridges, 3400–3600 m, Ayacucho.

Similar to *E. tenui* except: petiole scales imbricate, lamina broader (1–1.7 cm) and longer (to 31 cm), abundantly glandular, scales mostly ovate to deltate, ca. 1 mm long, costal and laminar scales often touching, adaxially also glandular, the scales more lanceolate.

Thus far known only from the type collection.

96. *Elaphoglossum quitense* (Baker) C. Chr., Index fil. 314. 1905.

Acrostichum quitense Baker, Ann. Bot. 5: 493. 1891. TYPE: Ecuador, Andes, Sodiro (isotype, P!).

Stem compact, horizontal, 3–5 mm in diameter, scales linear, lustrous, orange brown, to 13 mm long, entire. **Phylloodia** lacking. Leaves fasciculate, 11–21 cm long, 0.9–1.4 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, scales tan, linear, patent, some curved, lax, to 4 mm long, with some minute erect glandular trichomes. **Lamina** linear-elliptical, chartaceous, apex acute to obtuse, apiculate, base narrowly cuneate. **Veins** obscure, free, ca. 1 mm apart, at ca. 60-degree angle. **Hydathodes** distinct. **Lamina scales** abundant, narrow, not overlapping laterally, 1–2 mm long, pale, tan to white, adaxial surface glabrescent or with scales longer than on abaxial surface. **Fertile leaves** barely shorter to somewhat longer than the sterile, petiole $\frac{3}{5}$ – $\frac{3}{4}$ the fertile leaf length, lamina oblong, shorter than but as broad as the sterile, apex acute to obtuse, base rounded; perhaps with a few inter-sporangial scales.

Epiphytic in wet forests, 2500–3265 m, Cajamarca, La Libertad, San Martín, Huánuco, Junín. Colombia; Ecuador; Peru.

Cajamarca: Celendín, Gelig, *Mostacero et al.* 0899 (F, GH). Contumazá, *López et al.* 3727 (F, GH, NY). Callan-jaya, *Díaz & Vásquez* 634 (USM). **La Libertad:** W of Huamachuco, *Correll & E. Smith* P938 (GH). **San Martín:** Huallaga, Valley Río Apisoncho, *Hamilton & Hollligan* 904 (us). **Huánuco:** Cerro de Pasco, *Ellenberg* 4012 (GH). Mito, *Bryan* 389 (F). **Junín:** Huancayo, *Kunkel* 420, in part (GH).

97. *Elaphoglossum raywaense* (Jenm.) Alston, Bol. Soc. Brot. 2, 32: 24. 1958.

Acrostichum raywaense Jenm., Ferns Brit. W. Ind. 341. 1909. TYPE: Guyana, region of Mt. Raywa, on upper parts of Isorooroo River, *Jenman* (holotype, NY!; isotype, NY!).

Acrostichum apodum var. *sprucei* Baker, in Mart., Fl. bras. 1(2): 578. 1870. TYPE: Brazil, Prov. Alto Amazonas, in sylvis catinas prope S. Gabriel da Cachoeira, *Spruce* 2186 (not located).

Stem compact, horizontal, 0.3–1 cm in diameter, scales linear-lanceolate, yellow-brown to ferruginous, lustrous and sometimes resinous toward the tip, 5–8 mm long, undulate, entire. **Phylloodia** present. Leaves fasciculate, 18–56 cm long, 2.2–6 cm broad. Petiole almost lacking, 0.5–1.0 cm long, covered by dense subulate scales, 6 mm long, golden-orange, densely spreading on petiole and base of costa, 4–6 mm long, also with short, minute, resinous, brown, capitate glandular

trichomes on petiole and both faces of costa. **Lamina** oblanceolate, chartaceous, apex acuminate to long-caudate, base attenuate. **Veins** evident, free, ca. 0.8 mm apart, at 45-degree angle. **Hydathodes** lacking. **Lamina scales** on costa abundant, subulate, orange to orange-brown, mixed with many short, minute, resinous, capitate glandular trichomes, laminar scales brown-orange to yellow-orange, 0.5–1.5 mm long, spreading mostly on the adaxial surface, lamina also densely covered with short, appressed, resinous, capitate glandular trichomes which are usually oriented toward the margin, margin densely covered by 2 or more rows of fine subulate scales, similar in size and color to those on the costa. **Fertile leaves** shorter than the sterile, petiole about equal to that of the sterile leaf, lamina narrower than the sterile, lanceolate to linear-lanceolate, apex acuminate, base attenuate, petiole alate; intersporangial scales lacking.

Epiphytic in wet forests, 275–1200 m, Amazonas, San Martín, Loreto, Huánuco, Pasco, Junín, Ucayali, Madre de Dios.

Guianas; Venezuela; Ecuador; Peru; Brazil.

Amazonas: Bagua, Río Marañoñ, *Wurdack 1858* (us), 1989 (F, GH, NY, UC). **San Martín:** Mariscal Cáceres, Dist. Tocache Nuevo, *J. Schunke V. 13751* (MO, NY). Tingo María, *Allard 20888* (us). **Loreto:** Balsapuerto, Río Huallaga basin, *Killip & Smith 28498* (NY, us). Maynas, Alpahuayo, *van der Werff et al. 10264* (UC). **Huánuco:** between Huánuco and Pampayacu, *Kanehira 151* (GH, us). **Pasco:** Oxapampa, Palcazú, Río Alto Iscozacín, *Foster & d'Achille 10076* (F). **Junín:** Oxapampa, Shiringamazu, *D. Smith & Salick 8346* (UC). Cahuapanas, on Río Pichis, *Killip & Smith 26782* (us). **Ucayali** (as Loreto): Aguaytía, *J. Schunke V. 5495* (F, NY). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palotoa, *Foster et al. 10693* (F, GH).

98. *Elaphoglossum rimbachii* (Sodiro) Christ, Monogr. *Elaphoglossum* 126. f. 70. 1899.

Acrostichum rimbachii Sodiro, *Crypt. vasc. Quit.* 478. 1893. TYPE: Ecuador, Prov. Cuenca, entre Surrucucho y Quinoas, *Rimbach* (not located). *Elaphoglossum pichinchae* Christ, Monogr. *Elaphoglossum* 68. 1899. SYNTYPES: Ecuador, Pichincha, *Sodiro* (pl); Colombia, Azufral, Anden von Pasto, Columb., *André* 3224 and 3352 (not located).

Stem compact, 4–5 mm in diameter, scales linear-lanceolate, lustrous, dark maroon to black, 4–6 mm long, with stiff hairlike teeth (teeth deciduous with age). **Phylloodia** lacking. Leaves approximate, 25–105 cm long, 1.0–2.2 cm broad.

Petiole $\frac{1}{5}$ – $\frac{1}{3}$ the leaf length, scales dense to scattered, black, ca. 1 mm long, slightly spreading, long hair-toothed. **Lamina** linear-elliptic, chartaceous, apex acuminate to narrowly obtuse, base narrowly cuneate. **Veins** obscure, hidden by scales, ca. 1 mm apart, black, sclerotic, 1–3 mm long. **Fertile leaves** nearly equaling the sterile in length, petiole $\frac{1}{3}$ – $\frac{1}{2}$ the leaf length, lamina slightly narrower than the sterile; intersporangial scales present or lacking.

Epiphytic, less commonly terrestrial, in wet forests, 2200–3500 m, San Martín, Huánuco, Pasco. Ecuador; Peru.

San Martín: Mariscal Cáceres, Chochos, NW corner of Río Abiseo Nat. Park, *Young & León 4569* (USM), *Young 2190* (NY), 2241 (USM). **Huánuco:** Muña, *Macbride 4301* (F, GH, NY, us). Tambo de Vaca, *Bryan 651* (F, GH), 671 (F). **Pasco:** Oxapampa, 2–4 km N of Mallampampa, *D. Smith & Canne 5863* (MO).

99. *Elaphoglossum rosenstockii* Rosenst., Repert.

Spec. Nov. Regni Veg. 4: 6. 1907. TYPE: Ecuador, Mt. Cubilin, *Rimbach 8*, (holotype, s!; isotype, us!).

Elaphoglossum pseudohirtum Rosenst., Meded. Rijks. Herb. Leiden no. 19: 23. 1913. TYPE: Bolivia, in valle Corani, *Herzog 2165a* (not located).

Stem long-creeping, 2–3 mm in diameter, scales linear-lanceolate, lustrous, dark brown, 2–5 mm long, entire. **Phylloodia** evident. Leaves 1–3 cm apart, 24–35 cm long, 1.2–1.6 cm broad. **Petiole** $\frac{1}{2}$ – $\frac{3}{5}$ the sterile leaf length, with orange scales appressed to ascending, 1.5–3 mm long, erose. **Lamina** narrowly elliptic, chartaceous, apex obtuse, base cuneate. **Veins** obscure, free, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially dense, imbricate, orange to tinged with reddish, sclerotic, lanceolate to linear-lanceolate, erose-denticulate, 1–1.5 mm long, costal scales 2 mm long, wider than on the surfaces, erose, adaxially scattered (dense at first), ovate to lanceolate, erose, white, membranous. **Fertile leaves** about equal the sterile in length, the petiole $\frac{1}{5}$ the fertile leaf length, the lamina about equal the sterile in size and shape; intersporangial scales bicolorous, lanceolate, denticulate, 1.5 mm long.

Terrestrial in patches on open, mossy, rocky places, 3400–3950 m, Cajamarca, Amazonas, Ancash, Huánuco.

Cajamarca: Contumazá, Pampa de la Sal, *Sagástegui 10745* (F). **Amazonas:** Calla Calla Pequeña, *Clements 2023* (NY, USM). **Ancash:** Huari, Huascarán Nat. Park, *D. Smith et al. 12537* (NY). **Huánuco:** Tambo de Vaca, *Macbride 4450* (F).

100. *Elaphoglossum rubellum* Mickel, sp. nov.

Ab *E. siliquoides* statura minore et lamina apice acuta vel obtusa dispar.

Stem short-creeping, 2–3 mm in diameter, scales lanceolate, brown, with sparse, irregular teeth, contorted, zigzag, ca. 4 mm long. **Phylloodia** lacking. **Leaves** fasciculate, to 30 cm long, 2.1–3.2 cm broad. **Petiole** $\frac{1}{5}$ – $\frac{1}{3}$ the leaf length, with scales abundant, reddish to blackish, subulate, mostly 4–8 mm long, widely spreading, often curved, lax, petiole also with erect glandular trichomes (3-celled, gland-tipped, to 0.5 mm long). **Lamina** narrowly elliptic, chartaceous, apex obtuse, base truncate to rounded. **Veins** obscure, free, 1.5–2 mm apart, at 50–60-degree angle. **Hydathodes** evident. **Lamina scales** subulate, reddish, long and conspicuous, mostly 3–5 mm long, lax, uniformly and liberally distributed over the surface, margin and costa, lamina also with erect glandular trichomes as on petiole (3 cells, 0.2–0.5 mm long). **Fertile leaves** much shorter than the sterile, usually about $\frac{1}{2}$ the length, lamina orbicular to elliptic, apex obtuse, base rounded, scales on petiole, adaxial lamina surface, and abaxial costa, but intersporangial scales lacking.

TYPE—Peru, Ucayali (as Loreto), Coronel Portillo, Boquerón del Padre Abad, *Skog et al. 5127* (holotype, NY!; isotype, US!).

Endemic. Epipetric on wet shady calcareous cliffs, 400–470 m, Ucayali.

This closely resembles *E. siliquoides* of Jamaica in the very long, reddish, hairlike scales, short rounded fertile leaves, and relatively long, glandular trichomes, but differs in the smaller size, the acute to rounded lamina apex, and being epipetric rather than epiphytic.

Ucayali: Coronel Portillo, Dist. Padre Abad, *J. Schunke V. 3064* (F, US).

101. *Elaphoglossum ruficomus* Mickel, sp. nov.

Rhizomatis squamis linearibus ramosis purpureis, lamina laxe squamosa et stipite hirto recognita.

Stem compact, horizontal, ca. 10 mm in diameter, scales linear, long-attenuate, lustrous, maroon, 12–20 mm long, entire. **Phylloodia** indistinct. **Leaves** fasciculate, (30)–52–66 cm long, 2.5–3.6 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, with orange scales widely spreading, 8–12 mm long, ciliate, others 2–3 mm long, appressed. **Lamina** narrowly elliptic, chartaceous to coriaceous, apex acute, base broadly cuneate to rounded. **Veins** evident, ca. 1 mm apart, at ca. 60-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially 1–3 mm long, orange, lanceolate to ovate, imbricate to scattered, costa scales 3–4 mm long, linear-lanceolate, spreading, adaxially scattered, orange, 1–2 mm long, ciliate, lanceolate. **Fertile leaves** shorter than the sterile, petiole $\frac{1}{2}$ the fertile leaf length, lamina narrower than the sterile (2.0 cm broad); intersporangial scales lacking or present.

TYPE—Peru, Cajamarca, Celendín, Sendamal (Ruta á Celendín), *Sagástegui 12091* (holotype, NY!).

Endemic. Epipetric in wet forest or epipetric on brushy slopes, 3050–4200 m, Cajamarca, San Martín, Ancash.

San Martín: Mariscal Cáceres, Puenta del Monte, *Young 1740* (USM). **Ancash:** Yungay, Quebrada Llanganuco, *Perez 84* (USM). Yungay, Huascarán Nat. Park, *D. Smith et al. 9174* (NY).

102. *Elaphoglossum rufum* Mickel, Brittonia 37:

277. 1985. **TYPE:** Peru, Dept. San Martín, Lamas, along Río Curiyacu, 8 km above San Antonio, *Belshaw 3601* (holotype, US!; photo, NY!; isotypes, GH!, UC!).

Stem short-creeping, 3–4 mm in diameter, scales linear-lanceolate, ferruginous, 4–6 mm long, entire, tortuous toward tip. **Phylloodia** lacking. **Leaves** 31–50 cm long, 4.5–7 cm broad. **Petiole** ca. $\frac{1}{5}$ – $\frac{1}{3}$ the sterile leaf length, with scales abundant, spreading, subulate, somewhat denticulate, rufous, 2–3 mm long. **Lamina** lanceolate, chartaceous, generally with a proliferous bud in the retuse apex, otherwise acute to acuminate, base attenuate. **Veins** distinct to indistinct, free, 1 mm apart, at 60–70 degree angle. **Hydathodes** evident. **Lamina scales** sparse to moderately abundant on both sides, spreading, lanceolate to subulate, 2–3 mm long, denticulate, rufous, denser along costa and margin. **Fertile leaves** about same length as sterile, petiole ca. $\frac{5}{8}$ – $\frac{3}{4}$ the fertile leaf length, lam-

ina lanceolate to narrowly lanceolate, apex obtuse, base cuneate; intersporangial scales sparse to absent, lanceolate, entire to denticulate, spreading, denser along costa and margin, 1–2 mm long.

Endemic. Epiphytic in wet forests, 425–2250 m, Cajamarca, San Martín.

Cajamarca: Prov. Cutervo, San Andres, López & Ságastrugi 5428 (GH).

103. *Elaphoglossum russelliae* Mickel, sp. nov.

Ab *E. cardenasi* non nisi lamina integerrima stipite breviore diversa.

Named for Ruth Russell, who has been a volunteer in the New York Botanical Garden fern herbarium for 17 years.

Stem short-creeping, ca. 4 mm in diameter, scales flat, ovate-acuminate, 2–3 mm long, appressed, dark brown, sparse. **Phyllopodia** lacking. **Leaves** fasciculate, to 55 cm long, 2.2–3.0 cm broad. **Petiole** about $\frac{1}{3}$ the sterile leaf length, sparsely clothed with tan, ovate scales 1–3 mm long, mostly appressed. **Lamina** linear-elliptic, thin, apex acuminate, base narrowly to broadly cuneate, margin crenulate. **Veins** evident, free, 1–2 mm apart, at 60–70-degree angle. **Hydathodes** evident. **Lamina scales** abaxially on costa tan, lanceolate, ca. 1 mm long, occasional on margin between crenulations, laminar surfaces with minute stellate trichomidia. **Fertile leaves** shorter than sterile, petiole about $\frac{3}{4}$ the fertile leaf length, lamina smooth-margined, lanceolate, apex acuminate, base truncate to subcordate; intersporangial scales lacking.

TYPE—Peru, Cajamarca, Cutervo, Parque Nacional de Cutervo, Diaz & Osores 2587 (holotype, NY!).

Endemic. Epiphytic in dry woods, ca. 2150 m, Cajamarca, Huánuco.

This is probably the precursor of the bizarrely divided *E. cardenasi*, differing only in the dissection and shorter petiole.

Huánuco: Muña, Bryan 531 (F), 533 (F).

104. *Elaphoglossum setigerum* (Sodiro) Diels, Nat. Pflanzenfam. 1(4): 333. 1899.

Acrostichum setigerum Sodiro, Anales Univ. Quito 4: 174. 1890. TYPE: Ecuador, Cordillera occidental near Nono, Sodiro (holotype, not located).

Stem compact, horizontal, to 6 mm in diameter, scales linear, reddish orange, to 10 mm long, entire. **Phyllopodia** lacking. **Leaves** fasciculate, 18–28 cm long, 1.7–2.4(–3.6) cm broad. **Petiole** $\frac{1}{4}$ – $\frac{2}{3}$ the sterile leaf length, with scales reddish-orange, spreading, subulate, entire, 2–3 mm long. **Lamina** narrowly elliptic, chartaceous, apex acuminate to cuspidate, base rounded. **Veins** distinct, free, 1.5–2.5 mm apart, at 60–70-degree angle. **Hydathodes** evident. **Lamina scales** scattered, reddish-orange, subulate, slightly dentate, denser at margin, spreading, ca. 2 mm long on costa and margin, 1 mm long on surface, fewer scales on the adaxial surface. **Fertile leaves** slightly shorter than the sterile, petiole $\frac{3}{3}$ – $\frac{3}{4}$ the fertile leaf length, lamina lanceolate, apex acute, base truncate to cordate; intersporangial scales lacking.

Epiphytic(?) in wet forests, 3100 m, Amazonas, Ecuador; Peru.

This species closely resembles *E. crinipes* C. Chr. of Mesoamerica and Hispaniola, and may prove to be the same.

Amazonas: Prov. Chachapoyas, Cerros Calla Calla, Hutchison & Wright 5797, in part (GH), 5798 (UC).

105. *Elaphoglossum simulans* Mickel, sp. nov.

Ab affini *E. eximio* stipite longiori et lamina latiori base truncata diversa.

Stem creeping, ca. 5 mm in diameter, stem scales flat, appressed, ovate-lanceolate, brown, entire, 2–3 mm long. **Phyllopodia** lacking. **Leaves** 5–10 mm apart, 30–40 cm long, 1.5–2.2 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, with scales scattered, light brown, tightly appressed at petiole base, distally patent, 1–3 mm long, orange-tan, dense, linear-lanceolate, some subulate. **Lamina** linear or pedately divided into three arms, thin-textured, apex acuminate, base broadly cuneate to truncate, margin crenulate. **Veins** evident, 1.5–2 mm apart, at ca. 70-degree angle. **Hydathodes** evident. **Lamina scales** on costa scattered, orange-tan, subulate, 2–3 mm long, spreading; adaxially scales reduced to sparse squamules 0.3–0.5 mm long, abaxially to stellate trichomidia. **Fertile leaves** unknown.

TYPE—Peru, Cuzco, Urubamba, Machu Picchu, *Peyton & Peyton 1316* (holotype, GH!).

Endemic. Terrestrial in wet forests, 2560–2810 m, Cuzco.

This is like *E. eximium* but in *E. simulans* the stem is long-creeping, the petiole longer, the lamina broader and more truncate at base, there are stellate trichomidia on the lamina, costal scales are spreading, the margin is crenulate, and veins are 2–2.5 mm apart.

I have not seen the one specimen of *E. cardenasi* reported from Peru (Gómez, 1972). There should be no question of its determination, it being so distinct in its pedate form, but the discovery of the same form of dissection in *E. simulans* lends some question to the record of *E. cardenasi*.

Cuzco: Urubamba, Machu Picchu, *Peyton & Peyton 1316b* (GH).

106. *Elaphoglossum squamipes* (Hooker) Moore, Index fil. 15. 1857. Figure 25f–g.

Acrostichum squamipes Hooker, Icon. pl. t. 197. 1837.

TYPE: Peru. Chachapoyas, *Mathews* (holotype, k!).

Stem long-creeping, ca. 1 mm in diameter, scales ovate to linear-lanceolate, dull orange-tan, entire, 3–6 mm long. **Phylloodia** lacking. Leaves 3–20 mm distant, 5–14 cm long, 1.1–2.2 cm broad. Petiole slender, $\frac{1}{2}$ – $\frac{2}{3}$ the sterile leaf length, moderately clothed with ovate, dull orange scales, these 2–3 mm long. Lamina ovate to lanceolate, subcoriaceous, apex obtuse, base broadly cuneate to rounded. Veins obscure, free, ca. 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. Lamina scales sparse, small, inconspicuous, 1–2 mm long, linear, often coarsely and irregularly dentate, especially toward the scale base, more frequent on the abaxial surface. **Fertile leaves** equal to or slightly longer than the sterile leaves, petiole ca. $\frac{3}{4}$ the fertile leaf length, lamina ovate to lanceolate, smaller than the sterile with a few dark brown to black scales along the abaxial costa and among the sporangia.

Epiphytic and epipetric in wet forests, 2100–3300 m, Amazonas, San Martín, Huánuco, Pasco.

Mexico to Panama; Venezuela and Colombia to Bolivia.

Elaphoglossum squamipes represents a distinct

group with long-creeping stems and broad, pale stem and petiole scales. It is very closely related to *Peltapteris*, which justifiably could be placed in *Elaphoglossum*, differing from *E. squamipes* et aff. only in leaf dissection.

Amazonas: Chachapoyas, upper slopes of Puma-urco ESE of Chachapoyas, *Wurdack* 692 (F, NY, UC, US). Chachapoyas, Cerros Calla Calla, 10 km above Leimebamba on road to Balsas, *Hutchison & Bennett* 4753 (F, GH, NY, UC). Chachapoyas, Cerros Calla Calla, 45 km above Balsas midway on road to Leimebamba, *Hutchison & Wright* 5825 (F, GH, NY, UC, US). **San Martín:** Mariscal Cáceres, Río Abiseo Nat. Park, above timberline, Puerta del Monte, *Young* 1997 (NY). Mariscal Cáceres, Parque Nac. Río Abiseo, valle Pampa de Cuy *León & Young* 1280 (USM). **Huánuco:** Mito, *Macbride* 3359 (F, US). Muña, *Bryan* 526 (F, US), *Macbride* 4024 (F, US). **Pasco:** Oxapampa, Oxapampa-Villa Rica Road, 7 km from road-head, *Smith & Alban* 5571 (NY). Oxapampa, San Alberto, *van der Werff* 8459 (UC).

107. *Elaphoglossum stenophyllum* (Sodiro) Diels, Nat. Pfanzengfam. 1(4): 333. 1899.

Acrostichum stenophyllum Sodiro, Crypt. vasc. Quit. 468. 1893. TYPE: Ecuador, Sancullan, *Sodiro*, Dec. 1889 (isotype, US!).

Similar to *E. tectum* in its round, white, peltate scales on the adaxial surface and round, ciliate scales on the petiole, but the abaxial surface in *E. stenophyllum* lacks stellate trichomes, having instead glandular dots below and scattered linear-lanceolate scales on the costa.

Terrestrial on shrubby slopes, 2750–3100 m, Amazonas, Huánuco.

Ecuador; Peru.

Amazonas: Chachapoyas, Cerros Calla Calla, *Hutchison & Wright* 5805 (UC).

108. *Elaphoglossum styriacum* Mickel, Brittonia 39: 326. 1987. TYPE: Venezuela, Bolívar, Chimantá Massif, *Steyermark* 75347 (holotype, MO!).

Stem compact, horizontal, ca. 3–4 mm in diameter, scales linear-lanceolate, orange, 2–3 mm long, entire or with occasional processes. **Phylloodia** present. Leaves fasciculate, 19–37 cm long, 2.5–4.9 cm broad. Petiole $\frac{1}{10}$ – $\frac{1}{6}$ the sterile leaf length, glabrous. Lamina oblanceolate to elliptic, coriaceous, margin distinctly thickened, apex acu-

minate to obtuse, subcuspidate, base narrowly cuneate-decurrent. Veins inconspicuous, free, 1 mm apart, at 55–65-degree angle. **Hydathodes** lacking. **Lamina scales** essentially lacking abaxially, lamina often lustrous, with scattered, dark, stellate trichomidia, adaxially glabrous. **Fertile leaves** equal to or slightly shorter than the sterile, petiole $\frac{2}{5}$ – $\frac{1}{2}$ the fertile leaf length, the lamina narrower than the sterile, 13–16 mm broad; intersporangial scales lacking.

Epiphytic and terrestrial in wet forests, 100–770 m, Amazonas, San Martín, Loreto, Pasco.

Venezuela; Peru.

This species is rather variable in its lamina shape: elliptic to oblanceolate, with apex obtuse to acuminate. The abaxial surface is usually lustrous and has scattered to sparse stellate trichomidia. The stem scales persist onto the phyllopodia, and are linear, orange, with irregular processes.

Amazonas: Bagua, along roadside from Chiriaco to Puente Venezuela, 43 km NE of Chiriaco, *Barbour* 4464 (MO). **San Martín:** Mariscal Cáceres, Granja Santa Ines, 4 km arriba de Tocache Nuevo, *J. Schunke* V.3651 (F, UC). Road between Moyobamba & Chachapoyas, E of Naranjos at Río Naranjos, *Croat* 58155 (F). **Loreto:** Mishuyacu, near Iquitos, *Klug* 1461 (NY, US). **Pasco:** Oxapampa, Valle del Palcazú, Río Palcazú, cerca de Iscozán, *León* 718 (F).

109. **Elaphoglossum tambillense** (Hooker) Moore, Index fil. 15. 1857.

Acrostichum tambillense Hooker, Icon. pl. t. 656. 1844.
TYPE: Ecuador, Tambillo, *Jameson* (holotype, K!; isotypes, B!, P!).

Stem compact, horizontal, to 10 mm in diameter, scales linear-lanceolate, reddish brown, to 7 mm long, entire. **Phyllopodia** lacking. Leaves fasciculate, 7–14 cm long, 1.4–2.3 cm broad. Petiole $\frac{2}{5}$ – $\frac{3}{5}$ the sterile leaf length, with scales lacking, but with minute gland-tipped trichomes present. **Lamina** ovate-lanceolate, chartaceous, apex cuspidate to acuminate, base truncate to rounded. Veins obscure, free, ca. 1 mm apart, at 70–80-degree angle. **Hydathodes** evident. **Lamina scales** lacking but gland-tipped trichomes present, especially at base near costa and near margin, mostly on abaxial surface. **Fertile leaves** shorter than the sterile, petiole $\frac{3}{5}$ the fertile leaf length, lamina similar to sterile in shape but smaller, apex acute; intersporangial scales lacking.

Grassy cliffs, upland gorge, 2000–2800 m, Huánuco, Cuzco.

Ecuador; Peru.

Huánuco: Mito, *Macbride* 3373 (F, US). **Cuzco:** Torontoy, *Herrera* 1326 (US).

110. **Elaphoglossum tectum** (Willd.) Moore, Index fil. 15. 1857.

Acrostichum tectum Willd., Sp. pl. ed. 4, 5: 102. 1810.
TYPE: Venezuela, Caripe, *Humboldt* (holotype, B!, Herb. Willd. 19520!; isotypes, LE!, P!).

Acrostichum elongatum Kunze, Linnaea 9: 31. 1834.
TYPE: Peru, ad Pampayacu, 1829, Herb. Kunze.
(holotype, LZ, destroyed; isotype, B?)
Elaphoglossum elongatum (Kunze) Moore, Index fil. 9. 1857.

Stem short- to moderately creeping, 2–4 mm in diameter, scales linear-lanceolate, dark reddish-black, sclerotic, lustrous, 3–5 mm long, with tortuous tip, entire, or with sparse pale weak hairlike teeth. Phyllopodia indistinct, usually hidden by scales. Leaves fasciculate to slightly spaced, to 3 mm apart, 15–44 cm long, 1.4–2.8 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with scales appressed, peltate, round with dark center and short hairlike teeth, often mixed with scattered dark scales like those of stem. **Lamina** linear-elliptic, apex long-acuminate, base narrowly cuneate. Veins obscure, free, mostly 0.7–1 mm apart, at ca. 80-degree angle. **Hydathodes** lacking. **Lamina scales** on adaxial surface white, appressed, round, peltate, dentate to ciliate, becoming glabrous with age, on abaxial surface reduced to stellate trichomes. **Fertile leaves** about as long as the sterile or slightly longer, petiole usually $\frac{1}{2}$ – $\frac{2}{3}$ the fertile leaf length, lamina narrower than the sterile; intersporangial scales lacking.

Terrestrial on rocks and walls, in woods and fields, 1800–2900 m, Cajamarca and Amazonas south to Ayacucho and Cuzco.

Mexico to Panama; West Indies; Venezuela and Colombia to Bolivia and Brazil.

This species is readily distinguished by the round, peltate scales on the petiole and adaxial lamina surface and stellate trichomes on the abaxial surface.

Cajamarca: Celendín, Gelig, *Mostacero* 866 (HUT, MO, UC). **Amazonas:** Chachapoyas, Cano Santa Lucia, *Wurdack* 735 (F, GH, NY, UC, US). Cerros Calla Calla, *Hutch-*

ison & Wright 48184 (us). **San Martín:** Tingo María, Allard 22205 (us). **Huánuco:** Prov. Huánuco, Chincha, entre Huánuco y Tingo María, Ferreyra 16941 (GH). Mito, Macbride & Featherstone 1391 (us). **Junín:** La Merced Chanchamayo, Soukup 1099 (f). Prov. Tarma, between Palea & Carpapata, Stork 10959 (k). Huacapistana, Killip & Smith 24177, 24319 (us). **Ayacucho:** Ccarrapa between Huanta & Río Apurimac, Killip & Smith 22424 (GH). **Cuzco:** Machu Picchu, road to ruins. León 460 (GH). Machu Picchu to San Miguel, Urubamba, Vargas 2066 (us).

111. *Elaphoglossum tenuie* Mickel, sp. nov.

Rhizomate tenuissimo squamis recurvis induto necnon lamina parva gracili infra laxe squamata notabilis.

Stem long creeping, ca. 1–2 mm in diameter, scales linear, lustrous, dark brown, ca. 5 mm long, recurved, with sparse small teeth. **Phylloodia** evident, ca. 5 mm long. **Leaves** 1–2 cm apart, 8–16 cm long, 0.4–0.6 cm broad. **Petiole** about $\frac{1}{2}$ the sterile leaf length, with orange scales scattered, appressed to spreading, 1 mm long, with small teeth. **Lamina** linear-elliptic, chartaceous, apex acuminate, base narrowly cuneate. **Veins** evident, free, 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially linear-lanceolate, 2 mm long, orange, cilio-denticulate, often contorted, with glandular base, adaxially scattered, lanceolate, dentate near scale base, mostly on costa. **Fertile leaves** not known.

TYPE—Peru, Cuzco, La Convención, Cordillera Vilcabamba. Dudley 11192 (holotype, GH).

Endemic. Epiphytic in wet forests, 3330–3410 m, Cuzco.

Thus far known only from the type.

112. *Elaphoglossum tenuiculum* (Fée) Baker, Ann. Bot. (London) 5: 491. 1891.

Acrostichum tenuiculum Fée, Mém. foug. 10: 6, t. 29, f. 2. 1865. **TYPE:** Venezuela, Tovar, Fendler 272 (holotype, P!).

Stem short-creeping, ca. 2 mm in diameter, scales linear-lanceolate, lustrous, castaneous to brown, ca. 2 mm long, entire. **Phylloodia** distinct. **Leaves** 1–2 mm apart, 9–13 (30) cm long, 0.4–2.0 cm broad. **Petiole** $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, with sparse stellate trichomes and glandular dots, occasionally with sparse scales near base. **Lamina**

linear, chartaceous, apex acuminate, base cuneate. **Veins** barely visible, free, ca. 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. **Lamina scales** lacking, stellate trichomes or resinous dots on abaxial surface, those on the adaxial surface with slight scale body. **Fertile leaves** shorter than the sterile, petiole about $\frac{1}{2}$ the fertile leaf length, lamina narrower than the sterile, 5 mm broad; intersporangial scales lacking.

Terrestrial on wet banks and cliffs, 1500–3650 m, Amazonas, La Libertad, Lima, Junín, Cuzco.

Costa Rica; Panama; Venezuela; Colombia to Bolivia and Brazil.

There is considerable variation in the degree of pubescent vs. glandular dots.

Amazonas: Chachapoyas, Quebrada Molina 5 km below Chachapoyas, Wurdack 653 (f, GH, UC, us). **La Libertad:** 3 km W of Huamachuco, Correll & Smith P936 (GH). **Lima:** Canta, 4 km up road Huamantanga from Lima-Canta road, Saunders 1247 (GH). **Junín:** Carpapata, 27 km from Tarma, Gentry et al. 39772 (f). Carpapata, above Huacapistana, Killip & Smith 24410 (us). **Cuzco:** Paucartambo, Manú Nat. Park, Skog & Skog 5197 (us). Paucartambo, Paso del Aguila, Pillawata, Vargas C. 22996 (GH). Río Marcapato, 60 km above Quincemil, Madison 1010 pp (GH). Hacienda Huy-Huy, Valle de “Graves” Bües 1823 (us).

113. *Elaphoglossum tomentellum* Mickel, sp. nov.

Lamina parva gracili squamis multo dissectis aurantiacis induta, necnon costae squamis lineari-lanceolatis ab affinis diversa.

Stem compact, horizontal, ca. 2 mm in diameter, scales linear, lustrous, castaneous, ca. 5 mm long, subentire, glandular. **Phylloodia** evident. **Leaves** fasciculate, 9–16 cm long, 0.4–0.7 cm broad. **Petiole** $\frac{1}{2}$ the sterile leaf length, scales orange, appressed to spreading, ca. 2 mm long, subentire or irregularly sparsely dentate. **Lamina** narrowly elliptic, chartaceous, apex acute to acuminate, base narrowly cuneate. **Veins** obscure, 1 mm apart, at ca. 70-degree angle. **Hydathodes** lacking. **Lamina scales** abaxially orange, much reduced to linear or ovate with cilia longer than the scale body, gland-based, costal scales linear, reddish, dentate, ca. 2 mm long; adaxial scales round to lanceolate, white, ciliate at base, ca. 1 mm long, or orange and dense when young, 1–2 mm long. **Fertile leaves** not known.

TYPE—Peru, Cajamarca, Contumazá, Cerro Campanillas, Guzmango, *Sagástegui* 2993 (holotype, GH!).

Rocky slopes, 3050 m, Cajamarca.

Thus far known only from the type.

114. *Elaphoglossum velongum* Mickel, sp. nov.

Ab *E. latifolium* lamina lineari et stipitis squamis aurantiacis sparsis abstat.

Stem compact, horizontal, 4–7 mm in diameter, scales linear-lanceolate, lustrous, orange, 7–10 mm long, with hairlike processes. **Phylloodia** present. Leaves fasciculate, 27–30 cm long, 1.8–2.1 cm broad. Petiole $\frac{1}{4}$ the sterile leaf length, at base with orange scales as on stem, reduced distally nearly to stellate trichomes, scales appressed to spreading. **Lamina** linear, subcoriaceous, apex acuminate, base narrowly cuneate. **Veins** obscure, free, 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** sparse, orange or white, highly dissected, almost tuft-like (these nearly reduced to stellate trichomes with long lax arms). **Fertile leaves** longer than the sterile, petiole $\frac{1}{2}$ the leaf length, lamina similar to the sterile in size and shape; intersporangial scales lacking.

TYPE—Peru, Amazonas, Leimebamba, *Woytkowski* 7842 (holotype, GH!).

Endemic. Terrestrial in wet forests, 2400–2800 m, Cajamarca, Amazonas.

Cajamarca: Celendín, La Ranca-Gelig, *Sagástegui* 12133 (NY). **Amazonas:** Cordillera de Calla Calla; Balsas-Leimebamba road, *Duncan* 2607 (US). Prov. Chachapoyas, Quebrada Molino, *Wurdack* 655 (US), 656 (US).

115. *Elaphoglossum vittarioides* Mickel, sp. nov.

Ab *E. eatonianum* Rhizomatis squamis ciliatis, costae squamis brevioribus, necnon lamina adaxialiter squamuosa recedens.

Stem compact, 2–3 mm in diameter, scales lanceolate-deltate, lustrous, black, very indurated, 2–3 mm long, with lax, tan, marginal trichomes. **Phylloodia** present but very short (5–8 mm). Leaves approximate, 21–35 cm long, 4–6 mm broad. Petiole $\frac{1}{10}$ – $\frac{1}{4}$ the sterile leaf length, scales scattered, appressed, black, with white teeth, to 2 mm long at petiole base, distally smaller and with pale scale margin. **Lamina** linear, coriaceous, apex

long-acuminate, base attenuate. **Veins** obscure. **Hydathodes** lacking. **Lamina scales** adaxially scattered, orange-tan, lanceolate, 1–1.5 mm long, subentire to very short-ciliate, some of those on costa with dark center, slightly imbricate to glabrescent, abaxially tightly appressed, orange or white with orange center, deltate, subentire to short-ciliate, to 1 mm long, costal scales linear-lanceolate, black, 1–1.2 mm long, distally with broader white margin, subentire to short-ciliate. **Fertile leaves** unknown.

TYPE—Peru, Cuzco, Paucartambo, Sta. Isabel, *Vargas* 1306 (holotype, UC!).

Endemic. Epiphytic in wet forests, 1150 m, Cuzco.

This forms a complex with *E. eatonianum* and *E. chloödes*, which see for further discussion.

Thus far known only from the type.

116. *Elaphoglossum vulcanicum* Christ, Monogr. *Elaphoglossum* 131. 1899.

Acrostichum furfuraceum Baker, J. Bot. 15: 166. 1877. not Kuhn, 1869.

TYPE: Ecuador, Andes of Quito, *Sodiro* (holotype, K).

Stem widely creeping, ca. 2–3 mm in diameter, scales linear, lustrous, dark red-brown, 2–6 mm long, entire to sparsely denticulate. **Phylloodia** distinct, ca. 2 cm long. Leaves ca. 1 cm apart, 10–27 cm long, 1.5–2.6 cm broad. Petiole $\frac{1}{3}$ – $\frac{1}{2}$ the sterile leaf length, scales black, sclerotic, appressed to spreading, ovate to lanceolate, 1–3 mm long, dentate. **Lamina** narrowly oblong, subcoriaceous, apex obtuse, base cuneate. **Veins** evident, free, 1 mm apart, at 60–70-degree angle. **Hydathodes** lacking. **Lamina scales** of costa black, ciliate, 1 mm long, deltate to lanceolate, scales on adaxial and abaxial surfaces scattered, orange (abaxially) or white (adaxially), margin with concentrated scales often black or flecked with black. **Fertile leaves** longer than the sterile, petiole $\frac{1}{4}$ the fertile leaf length, lamina linear, 3–6 mm broad, inrolled; intersporangial scales lacking.

Epiphytic in wet forests, 2450–3600 m, San Martín, Huánuco, Cuzco.

Ecuador; Peru; Bolivia.

Peyton & Peyton 945 has petiole scales more spreading than usual.

San Martín: Mariscal Cáceres, forest patch isolated above timberline, Chochos NW corner of Río Abiseo Nat. Park, *Young & León 4651* (USM). **Huánuco:** Muña, trail to Tambo de Vaca, *Macbride 4304* (F). Cushi, trail to Tambo de Vaca, *Bryan 623* (F). **Cuzco:** La Convención, Huayopata, 8 km from Incatambo, *Peyton & Peyton 945* (GH). Paucartambo, cordillera de 3 cruces, *Vargas C. 12241* (GH). Río Calzuda, Huadquiña, *Bües 1266* (US).

117. *Elaphoglossum wardiae* Mickel, Brittonia 37: 277. 1985. TYPE: Bolivia, Dpto. Cochabamba, Prov. de Chapare, road to San Onofre, *M. S. Foster 79-179* (holotype, UC!).

Stem short-creeping, 4 mm in diameter, scales dark brown, lustrous, narrowly deltate, crispatate, irregularly serrate, 2–3 mm long. **Phyllopodia** lacking. Leaves to 1 cm apart, 31–36 cm long, 4.0–5.7 cm broad. Petiole $\frac{1}{4}$ – $\frac{1}{3}$ the sterile leaf length, with scales abundant, appressed to spreading, lanceolate, peltate, tan, 2–3 mm long, minutely serrulate. **Lamina** lanceolate, chartaceous, apex notched with bud, base broadly cuneate. **Veins** distinct, free, 2–3 mm apart, at ca. 70-degree angle. **Hydathodes** evident. **Lamina scales** absent to sparse on both sides, peltate, deltate to lanceolate, somewhat appressed, tan, 1–2 mm long, minutely serrulate, sometimes more dense along margin. **Fertile leaves** nearly equal to the sterile in length, petiole $\frac{3}{4}$ – $\frac{4}{5}$ the sterile leaf length, lamina lanceolate, apex apiculate, base broadly cuneate; intersporangial scales abundant, peltate, ovate to lanceolate, finely serrulate, tan, 1–2 mm long, somewhat appressed on costa.

Epiphytic in wet forest, 700–1700 m, Huánuco, Madre de Dios.

Peru; Bolivia.

Huánuco: La Divisoria, NE of Tingo María on road to Pucallpa, *Moran 3703, 3705* (MO). **Madre de Dios:** Prov. Manú, Cerro de Pantiacolla, *Foster et al. 10890* (GH).

118. *Elaphoglossum williamsiorum*, Mickel, sp. nov.

Rhizomate longe repenti et frondibus elongatis trichomidiis stellatis minutis sparsis (minutum stellato-punctatis) notanda.

Named for Ethelyn and Victor Williams, who have long been supporters of the New York Bo-

tanical Garden fern program. Ethelyn has been the primary fern propagator, by spores, for the Garden for the past 16 years.

Stem long-creeping, 4–6 mm in diameter, scales lanceolate, lustrous, brown to black, ca. 3 mm long, entire. **Phyllopodia** present. Leaves ca. 3 cm apart, 75 cm long, 5.0–5.7 cm broad. Petiole $\frac{1}{2}$ the sterile leaf length, glabrous. **Lamina** narrowly elliptic, chartaceous, apex lacking, base attenuate. **Veins** obscure, free, 1 mm apart, at 70–80-degree angle. **Hydathodes** lacking. **Lamina scales** lacking adaxially, lamina abaxially with black stellate-punctate indument. **Fertile leaves** not seen.

TYPE—Peru, Cuzco, Urubamba, Machu Picchu, 0.5 km N of union of Sayacmarca & Aobamba Rivers, *Peyton & Peyton 1491* (GH).

Endemic. Terrestrial in wet forests, 2390 m, Amazonas, Cuzco.

This superficially resembles *E. amplum*, which see.

Amazonas: Bongará, above Pedro Ruiz on road to Pomacochas, *Knapp & Alcorn 7550* (UC). Prov. Chachapoyas, slopes of Puma-arcu SE of Chachapoyas, *Wurdack 554* (US).

119. *Elaphoglossum zebrinum* Mickel, sp. nov.

Ab *E. ob lanceolato* statura minori laminisque angustis diversa.

Stem short-creeping, 2–4 mm in diameter, scales mostly lacking, some small ones 1–2 mm long near apex, black, lustrous, linear-lanceolate, entire. **Phyllopodia** lacking. Leaves fasciculate, 32–47 cm long, 2.3–3.4 cm broad. Petiole nearly lacking, to $\frac{1}{10}$ the sterile leaf length, glabrous but with white blotches on petiole and lamina (mostly between the veins). **Lamina** linear-ob lanceolate, chartaceous, costa strongly keeled, apex acuminate, base long-attenuate. **Veins** obscure, free, 1.5–2 mm apart, at ca. 70-degree angle. **Hydathodes** distinct. **Lamina scales** sparse on both surfaces, subulate, brown, generally less than 1 mm long. **Fertile leaves** slightly shorter than the sterile, petiole about $\frac{1}{2}$ the sterile leaf length; intersporangial scales lacking.

TYPE—Peru, Amazonas, Bagua, Valley Río Marañón, *Wurdack 1859* (holotype, US!).

Epiphytic in wet forests, 295–1000 m, Lambayeque, Amazonas, Madre de Dios.

Colombia; Peru.

Lambayeque: Puerto Nazareth, near Olmos, *Ellenberg* 3427 (GH). **Madre de Dios:** Manú, Cerro de Pantiacolla, Rio Palotoa, NNW of Shintuya, *R. Foster* 10639 (F), 10891 (GH).

Comments

At the time the manuscript was being delivered to the printer, two more new species were discovered. Although it was impractical at this point to revise the key and order of species, they are included here as addenda.

Elaphoglossum pattersoniae Mickel, Amer. Fern J. 80: 110. 1990. TYPE: Peru, Pasco, Prov. Oxapampa, Oxapampa-Villa Rica road, *D. Smith & Alban* 5590 (holotype, NY!; isotype, MO!).

Stem compact, horizontal with ascending apex, scales linear, lustrous, dark red-brown, ca. 4 mm long, denticulate, ascending. **Phylloodia** present. **Leaves** fasciculate, 6–16 cm long, 1.2–1.8 cm broad. **Petiole** $\frac{1}{3}$ the sterile leaf length, scales 1–2 mm long, linear-lanceolate, ascending to spreading, dark red-brown, lustrous, cilio-denticulate. **Lamina** elliptic, chartaceous, apex obtuse to broadly acute, base cuneate. **Veins** at 55–60-degree angle. **Hydathodes** lacking. **Lamina** surface adaxially with scattered orange-tan, stellate to lanceolate cilio-denticulate scales, to 0.5 mm long, costal scales more abundant and lustrous red-brown, those on abaxial surface more sparse, smaller, and costal scales mostly orange-tan. **Fertile leaves** longer than the sterile, petiole $\frac{2}{3}$ the leaf length, similar to sterile but narrower, ca. 8 mm broad; scales of petiole and adaxial lamina surface mostly substellate, lustrous, dark red-brown, appressed; intersporangial scales lacking.

Terrestrial in high montane rain forest, 2120 m. *Elaphoglossum pattersoniae* is closest in Peru to *E. guamanianum*, but differs from that in its smaller size, acute-obtuse lamina apex, lack of dark-arachnid scales on the costa abaxially, and fewer laminar scales.

Known only from the type.

Elaphoglossum potomogeton Mickel, Amer. Fern J. 80: 112. 1990. TYPE: Peru, Junín, Prov. Chanchamayo, Chilpez, ca. 26 km S of San

Ramón, *D. Smith & Palacios* 2653 (holotype, NY!; isotype, MO).

Stem long-creeping, 1–1.5 mm in diameter, scales linear, lustrous, dark red-brown, ca. 3 mm long, entire, slightly recurved. **Phylloodia** present, covered by scales. **Leaves** 0.5–1.5 cm apart, 13–17 cm long, 1.7–2.2 cm broad. **Petiole** $\frac{2}{5}$ – $\frac{1}{2}$ the sterile leaf length, scales 2–3 mm long, linear-lanceolate, spreading and recurved to appressed distally on the petiole, tan to sclerotic, red-brown, entire. **Lamina** elliptic, chartaceous, apex obtuse, base broadly cuneate. **Veins** obscure, ca. 1 mm apart, at 65-degree angle. **Hydathodes** lacking. **Lamina scales** ovate to ovate-deltate, fimbriate-denticulate, ca. 0.5 mm long, sparse abaxially, abaxially and adaxially concentrated at the margin, to 1 mm long, lamina surfaces with scattered glandular dots. **Fertile leaves** longer than the sterile, petiole ca. $\frac{1}{3}$ the frond length, similar to the sterile in apex and base but narrower, ca. 1 cm broad; intersporangial scales lacking.

Epiphytic, primary high montane forest dominated by *Podocarpus*, *Cedrela*, and *Juglans neotropica*, 1720–1850 m.

Elaphoglossum potomogeton resembles *E. puanæ* and *E. longius* in the slender, long-creeping stem with red-brown recurved scales and the lamina surface with glandular dots. It is distinct from those species in its obtuse lamina apex and laminar scales concentrated at the lamina margin.

Known only from the type.

The following names, based on Peru material collected by Poeppig, undoubtedly pertain to species of *Elaphoglossum*. However, they cannot be placed without reference to the original specimens, which have not been located.

Acrostichum adenolepis Kunze, Linnaea 9: 27. 1834. TYPE: Peru, Pampayacu, *Poeppig*, Jul. 1829 (holotype, not located).

Acrostichum calophyllum Kunze, Linnaea 9: 27. 1834. TYPE: Peru, Pampayacu, *Poeppig* (holotype, not located).

Acrostichum curvans Kunze, Linnaea 9: 30. 1834. TYPE: Peru, Pampayacu, *Poeppig diar.* 1115, Jul. 1829 (holotype, not located).

Acrostichum dissimile Kunze, Linnaea 9: 28. 1834. TYPE: Peru, Cassapi, *Poeppig*, Jul. 1829 (holotype, not located).